

THE RAILWAY GAZETTE
A Journal of Management, Engineering and Operation
INCORPORATING
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The Railway Times • Herapath's Railway Journal • RAILWAY RECORD.
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DIESEL RAILWAY TRACTION SUPPLEMENT

The May issue of THE RAILWAY GAZETTE Supplement, illustrating and describing developments in Diesel Railway Traction, will be ready on May 1, price 1s.

GOODS FOR EXPORT

The fact that goods made of raw materials in short supply owing to war conditions are advertised in this paper should not be taken as indicating that they are available for export

NOTICE TO SUBSCRIBERS

Consequent on the paper rationing, new subscribers cannot be accepted until further notice. Any applications will be put on a waiting list and will be dealt with in rotation in replacement of subscribers who do not renew their subscriptions

POSTING "THE RAILWAY GAZETTE" OVERSEAS

We would remind our readers that there are many overseas countries to which it is not permissible for private individuals to send printed journals and newspapers. THE RAILWAY GAZETTE possesses the necessary permit and facilities for such dispatch.

We would emphasise that copies addressed to places in Great Britain should not be re-directed to places overseas

TO CALLERS AND TELEPHONERS

Until further notice our office hours are:

Mondays to Fridays 9.30 a.m. till 5.30 p.m.

The office is closed on Saturdays

ANSWERS TO ENQUIRIES

By reason of staff shortage due to enlistment, we regret that it is no longer possible for us to answer enquiries involving research, or to supply dates when articles appeared in back numbers, either by telephone or by letter

ERRORS PAPER, AND PRINTING

Owing to shortage of staff and altered printing arrangements due to the war, and less time available for proof reading, we ask our readers' indulgence for typographical and other errors they may observe from time to time, also for poorer paper and printing compared with pre-war standards

An Encouraging Budget

SIR JOHN ANDERSON'S first Budget is an encouraging indication of the nation's financial stability and strength at a peak point in a war of unprecedented cost. The minor concession in Excess Profits Tax, whereby other than profits standards are to be increased by £1,000, will benefit small businesses; of wider importance is the special initial allowance for wear and tear of 20 per cent. in the case of new machinery, which is to be introduced after the war in respect of income tax. This allows one-fifth of actual expenditure on plant and machinery in any year to be written off against the profits of that year. There will be a 20 per cent. deduction on all new plant and machinery, and 10 per cent. on all new industrial buildings. Provision for obsolescence allowance in respect of machinery scrapped, whether replaced or not, and allowances for normal expenditure on research as a deduction from profits for income tax purposes, will also be welcomed. The refusal to entertain any reduction of the 100 per cent. E.P.T. levy during hostilities will cause disappointment, particularly in view of the Chancellor's obvious appreciation of the importance of developing export trade.

The London Passenger Transport Board's Strikes

The recent unofficial strikes by sections of the London busmen are in striking contrast with the freedom from labour stoppages which has characterised the railwaymen, although there can be little doubt that the work of the latter during the war has been more arduous and exacting. Indeed, the history of the London Passenger Transport Board has not been too happy in its labour relations, and it would certainly seem that it affords an unfortunate example for those who advocate control of transport, or other large industries, by a quasi-public board. Among the advantages which are sometimes put forward for this form of control is the suggestion that relations with labour would be improved, and that industrial peace would be promoted. We have previously questioned the validity of this argument, both in the case of bodies such as the London Passenger Transport Board, or those which might be set up under a complete nationalisation scheme. The recent tendency for sections of labour in various industries to act independently of the recognised machinery of negotiation might not be lessened if the ownership of the undertaking were changed, but in the case of transport at least it is fairly obvious that the privately-owned railways have evolved better and more loyally-observed agreements with their labour than some other forms.

Eire Train Service Cuts

Considerable dislocation of trade and industry, with resultant unemployment, is feared in Eire as the result of the drastic further reductions of train services on the Great Southern Railways, attributed to the stoppage of coal supplies from Great Britain, which became effective on Monday last, April 24. We outline the details in Transport Services and the War (page 449), and it is noteworthy that the impact of war on the transport of a country which makes much of its neutrality appears to be more severe than in any of the belligerent or occupied territories. In general, the once-daily service of passenger trains which heretofore has been maintained by the Great Southern Railways, has been replaced by a twice-weekly service on main and principal branch lines, with eleven branches entirely closed. Goods trains now operate only four times a week. The cattle trade is expected to be affected most seriously, and the transport of turf (with which Eire has been eking out her fuel supplies) will doubtless prove even more difficult than the inherent bulkiness causes in any event. Dining cars have been withdrawn, to provide the maximum of ordinary accommodation within the practicable weight of the trains. A system of priorities is being applied to the issue of passenger tickets and to the acceptance of goods traffic; the latter will be regulated from time to time in accordance with the directions of the Minister for Industry & Commerce. It is noteworthy that the Great Northern Railway system is not affected.

Eire Transport Bill

In the new Eire Transport Bill, the text of which was issued in Dublin on April 20, provision is made for the incorporation on July 1 of the new statutory transport company which is to acquire on that date the undertakings of the Great Southern Railways Company and of the Dublin United Transport Company. Stocks of the new undertaking will be exchanged for stocks in the existing companies, which are to be dissolved. The Bill envisages a capital for the new company not exceeding £20,000,000, of which not more than £16,000,000 is to consist of redeemable debentures guaranteed by the Government and bearing interest at the rate of 3 per cent. The remaining

£4,000,000 is to be in common stock, entitled to a maximum dividend of 6 per cent. The official preliminary details of the scheme were published in *The Railway Gazette* for November 5 of last year (page 453), and the further developments amounting to the proposal for compulsory acquisition, in default of agreement were recorded on January 21 of the present year (page 54). The Dublin United Transport Co. Ltd. agreed by 21,972 votes to 3,691 (as announced at an extraordinary general meeting on February 11), to the Government terms for the compulsory acquisition of the undertaking. Its stockholders will receive for every £10 (nominal) stock either common stock or debentures of £14 10s. in the new company.

Gas-Turbine Engine Research Centre

The Ministry of Aircraft Production in its statement in the House of Commons on April 19, explained that the State had decided to purchase the undertaking responsible for the development of jet-propulsion aircraft engines, and that a Government-owned research centre for gas-turbine technology is to be established bore out a suggestion made in our January 14 issue. At that time, when commenting on the advent of jet propulsion for aircraft, it was pointed out that the development of this form of propulsion no doubt had also involved development of the internal-combustion turbine, and that this was likely to have a wide application to many branches of engineering. It has been applied experimentally already to a locomotive in Switzerland. Sir Stafford Cripps thought the development of gas-turbine engines had reached a stage at which the national interest required the development of a permanent Government-owned research centre for gas-turbine technology, so that the full potential benefits from this type of power plant could be secured. Although it is very unlikely that jet propulsion in itself will have any direct application to ground transport, research and development on metallurgical and aerodynamical problems which have been involved in gas-turbine design, may well have a profound effect, and lead to greater progress in the gas-turbine locomotive sphere than would otherwise have been possible.

Overseas Railway Traffics

In the stocks of British-owned railways in Argentina there has been a tendency to slightly lower prices, but it has not gone far. Traffics in the 41st and 42nd weeks of the financial year have been well maintained except on the Buenos Ayres Great Southern, which shows a decrease of £21,000 in the two weeks. This decrease, however, goes against an increase of £121,900 in the corresponding two weeks of 1943. The Central Argentine in the 41st and 42nd weeks of the current financial year shows an improvement in receipts of £55,647, the Buenos Ayres & Pacific one of £27,540 in the same period, the Buenos Ayres Western one of £11,460, the Argentine North Eastern one of £4,602, and the Entre Rios one of £3,030. On the Antofagasta the traffics from January 1 to April 16, 1944, have been £448,220, an increase of £23,230 over 1943. Great Western of Brazil receipts for the same period are £98,200 higher at £354,000.

	No. of	Weekly	Inc. or	Aggregate	Inc. or
	week	traffics	dec.	traffic	dec.
		£	£	£	£
Buenos Ayres & Pacific*	42nd	129,840	+14,940	4,418,760	+240,120
Buenos Ayres Great Southern*	42nd	158,640	-9,180	7,503,000	+700,440
Buenos Ayres Western*	42nd	69,360	+13,980	2,342,040	+81,600
Central Argentine*	42nd	168,315	+35,037	6,286,737	+714,480
Canadian Pacific	15th	1,237,000	+173,000	17,365,600	+2,589,400

* Pesos converted at 16½ to £

Traffics of the Nitrate Railways for the first 15 weeks of 1944 are estimated at £61,552, an improvement of £19,494 on the corresponding period of 1943.

Twenty Years Finnish Air Traffic

Twenty years ago, in March, 1924, the Finnish air traffic company Aero O.Y. began operating an air line between Helsinki and Tallinn (Estonia), the first regular air service to be worked by Finnish aircraft. The Helsinki—Stockholm air service, worked in pool with the Swedish Aerotransport A.B., was opened in June, 1924. In 1926, the Finnish Parliament granted Aero O.Y. its first subsidy, amounting to Finnmark 2,500,000. Further milestones in the development of the company's services were the extension of the Helsinki—Tallinn line as far as Riga in 1928, and its intensification in 1934. The civil aerodrome at Turku (Abo), the only intermediate landing place of the Helsinki—Stockholm route, was opened in September, 1935, and in 1936 the civil airport of Helsinki was placed in service. This was followed by the extension of the Helsinki—Riga service to

Kaunas (Lithuania), Königsberg, and Berlin, a route that was worked in common with the Deutsche Lufthansa. The first Finnish inland air line was put into service in 1937 and was extended as far as Petsamo, the northernmost seaport in the country, in the summer of 1940. Aero O.Y. was established in November of 1923 and owned but one passenger plane at first. Its only regular air line at present is between Turku (Abo) and Stockholm, operated jointly with the Swedish Aerotransport. The Aero O.Y. fleet of some 20 aircraft is almost wholly in the service of the Forces. The passengers carried in its own planes during the past twenty years total 108,458; freight carried totals 1,244,267 lb.; luggage 3,475,875 lb.; and mail 1,719,882 lb. The distance flown in this 20-year period was 3,106,800 miles.

Forty Years of a Famous Train

On December 14, 1943, the Merchants Limited of the New York, New Haven & Hartford Railroad celebrated its fortieth anniversary. In 1903 prominent business men in both New York and Boston, who wanted to be able to complete a full day's business in one city and then to travel the 229 miles to the other before night, requested the railway to provide the necessary facilities, and the Merchants Limited was the outcome. Originally installed on a 5-hr. schedule, the train had its times pared by degrees until it is now down to 4½ hr., although during the war the timing has been eased to 4 hr. 20 min. From both the Grand Central Terminal in New York and the South Station in Boston the two trains start at 4 p.m., and reach their destinations at 8.20 p.m., calling intermediately at New Haven and Providence. Intermediately the fastest run is over the 113 miles between New Haven and Providence in 114 min., inclusive of several service slacks. Electric power is used between New York and New Haven, and steam—or, more recently, diesel-electric—between there and Boston. The "Merchants," as it is generally known, is an all-Pullman train, and is the only remaining train on the New Haven on which a special service charge is required, in addition to first class fare and Pullman supplement. It was the first train in the States on which twin dining cars were run, to cope with the business, and, from December 23, 1930, the first train in the U.S.A. to run entirely on roller bearings. During its history the Merchants Limited has completed nearly 6,000,000 miles and has carried over 4,000,000 passengers.

Control of Canals

A further stage has been reached in the Government control of canals by an Order made by the Minister of War Transport, giving the canal undertakings power to enter into any necessary agreements with the Government. This Order, which was signed on April 4, is termed the Canals (Agreement) Powers Order, 1944, and applies to any canal, inland navigation, or canal carrier undertaking over which the Minister of War Transport has taken control, or which may come under his control in the future. The scheme, under which control is to be vested in the Ministry until at least one year after the cessation of hostilities, provides for the payment of fixed annual sums in return for which the Ministry will take the receipts and meet the expenditures of the controlled undertakings. The fixed annual sum to be paid to each controlled undertaking will be based on the average net revenue of the three pre-war years, and provision is made for certain adjustments in that sum to meet individual circumstances. One of the most important of these is that an adjustment will be made for any increase in the deadweight tonnage operated by a controlled undertaking at the commencement of control, as compared with that in the basic period.

Radio Telephone Tests on the L.N.E.R.

Some months ago the London & North Eastern Railway, in collaboration with Rediffusion Limited, carried out experiments with radio-telephone apparatus with the object of enabling engine crews and guards of freight trains to carry on conversation while the train was in motion. These experiments were successful, and a further series of tests was carried out recently. On this occasion Sir Ronald Matthews, Chairman of the London & North Eastern Railway Company, from his office at a London terminus, spoke by radio telephone with Sir Charles Newton, the Chief General Manager, who was travelling north on the East Coast main line in a specially-equipped train. Reception in both directions was very successful; during the experiments contact was made by means of three different trunk telephone exchanges of the L.N.E.R. The tests suggest that the installation of radio telephone on trains after the war is a practicable proposition. The development opens the way to further amenities for railway travellers, and the experiments indicate the awareness of the railway of the need constantly to improve facilities for their

customers. The results arising from the tests should be of value in the provision of means of maintaining contact with train crews from control offices.

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A Remarkable Rule Book

The operating, block-signalling and interlocking rules of the American railways, although varying to some extent, according to the requirements of each line, are based on a common, agreed form known as the Standard Code, which is issued as an official publication by the Association of American Railroads. The first edition of the code appeared in 1889 and was signed by a committee of nine for the General Time Convention, as forming "uniform train rules and rules for the movement of trains by telegraphic orders." Many editions have been issued since then and the one now in force dates from about five years ago. It is an impressive pocket book of no fewer than 854 pages, which seems very formidable at first sight. Only a modest proportion of its pages, however, is taken up with the rules now applying, corresponding broadly with those found in the rule book of any particular railway. The remainder is occupied with a presentation of each rule in the various forms it has passed through in the course of the revisions, with a section devoted to a comprehensive series of typical questions on the meaning and interpretation of the rules, with the answers given by the A.A.R. Committee. This is a very valuable feature of the volume, as it enables the student to follow all the changes made in the rules since the code first appeared and to understand many points connected with them that would otherwise be obscure. Until recent years the operating rules were always known as train rules.

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Slipping Driving Wheels

The recent paper read before the Permanent Way Institution on "How Rails Break," of which a summary was published in our March 3 issue, included among the causes of failure the damage done to rails by skidding wheels. The worst effects are often seen at the exits from main-line stations from which heavy trains have to be restarted, and especially where the start has to be made on a rising gradient. It is also apparent, even to the casual observer, that the tendency to slipping with the latest and most powerful passenger locomotive classes is more pronounced than with most of their predecessors. In this connection it is not without interest that whereas, until the advent of the G.W.R. "Kings," the limit in the ratio of tractive effort to adhesion weight for express engines was normally about 530 to 540 lb. per ton, in the latest types a ratio closely approaching 600 lb. per ton is the normal figure. To take specific cases, the "Kings" and the L.M.S.R. Pacifics have 597 lb. tractive effort to every ton of adhesion weight, and the S.R. "Merchant Navy" Pacifics 595 lb., whereas with the G.W.R. "Castles" the figure is 538 lb., with the L.N.E.R. streamline Pacifics 537 lb., with the earlier L.N.E.R. Pacifics 498 lb., with the L.M.S.R. "Royal Scot" 4-6-0s 530 lb., and with the S.R. "Lord Nelson" 4-6-0s 541 lb. If there is to be further development of passenger locomotive power in this country, it seems inevitable that, as in the United States, eight-coupled wheels will be needed to provide adequate adhesion; even now it is a question whether tractive power is not outstripping adhesion weights.

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"Left, Right"

Once more the correspondence columns of newspapers are assailed by the partisans of left-hand or right-hand drive, but such effusions refer mostly to the rule of the King's Highway. Arguments are marshalled with an ingenuity and a fervour which fill one with admiration. The railways, being rather a specialist organisation, have not been dragged into the discussion. We in our role of observers of railway matters are not so concerned about trains travelling on the left or on the right. Strangely enough it does not seem to matter. Our immediate interest is to discover the exact rule for passengers ascending and descending platform stairways, footbridges, and involved sinuous passages. When we try at New Street Station, Birmingham, to cross the famous footbridge on the right-hand side, we are quickly recalled to our senses by the loud voice of a policeman bidding us get over on left. But when we ascend the Metropolitan stairway at Baker Street we find the rule has been reversed. "Ah!" we think to ourselves, "It's keep to the right at Baker Street." But, lo! when we come to ascend the next little flight to the street, it has returned to "Keep to the left." So the great British travelling public decides it will make its own rules and consequently our progress becomes a sort of game, individuals performing a feinting or dribbling action with their opposite numbers for all the world like a gigantic football match, with no ball, and suitcases in one's hands for ballast. Perhaps the doughty champions in the

columns of the newspapers would deign to settle this small matter of stairways, passages, and footbridges in our own railway stations before setting out to revolutionise the driving habits of half the globe.

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Call for a Mighty Transport Effort

IF an early victory in the world war is to be won, transport must be available this year in unprecedented volume and in full efficiency. Since the tide of battle turned in favour of the Allies, all their successes have depended on the mass movement of troops together with immense quantities of munitions, equipment and stores of all kinds. Perhaps the transfer of whole armies overseas stirs our pride and fires our imagination more than the everyday tasks of internal transport, but everywhere rail, road, inland waterway, and coastal services have played an indispensable part in their respective spheres. Heavy as the demands on inland transport have been since the outbreak of war, there will be a call for a mighty effort in 1944, and the brunt of the pressure will fall on the railways of Great Britain, America, and the Dominions. It will therefore be instructive to examine some of the measures which have been taken already to cope with the rising flood of freight and passenger traffic. We can commence conveniently with an account of American developments because we have just received the 1943 Review of Railway Operations prepared by Dr. Julius H. Parmelee, Director, Bureau of Railway Economics, Washington, D.C., and there is no corresponding authoritative survey of the work of our main-line companies in existence. For our present purpose we shall use Dr. Parmelee's commentary on happenings in 1942 and 1943 more than his statistics of railway performance, as many of these figures have been quoted in previous articles dealing with the wartime work of the U.S.A. railways.

When America entered the war, President Roosevelt set up the Office of Defense Transportation to ensure that the best possible use was made of all domestic carrying facilities, and appointed Mr. J. B. Eastman as its Director. In Mr. Eastman's own words O.D.T. is an experiment in the field of co-operation. The new agency does not manage or operate carrying services. With a full knowledge of transport requirements due to war conditions, it settles policy and guides the activities of the carriers so as to keep traffic moving and avoid congestion. When additional facilities are needed, O.D.T. urges their provision and also advises the War Production Board about the materials and equipment required by the carriers. In many respects the functions of O.D.T. resemble the jurisdiction exercised by our Ministry of War Transport over the conveyance of passengers and goods within these islands. These two bodies discharge their duties in much the same fashion, consulting constantly with carriers, traders and Government Departments and relying as far as practicable on persuasive methods in preference to issuing directions. Up to the end of 1943 O.D.T. promulgated 41 general Orders and one or two examples will show how its decrees compare with the action taken by M.W.T.

On October 4, 1942, an Order froze all railway passenger schedules in the United States. Special passenger trains, new trains and extra "portions," which had not been run for at least 20 per cent. of the time during the preceding 90 days, were prohibited. M.W.T. has likewise limited train mileage, treating 1941 as the basic year. In particular it has consistently refused to allow the running of additional trains for distances over 60 miles at Bank Holiday periods and has rigidly restricted the summer timetables. Both O.D.T. and M.W.T. have declined to attempt to ration travel and have striven to induce the people to make only those rail journeys which are really necessary. Sceptics challenge the efficacy of these appeals, but O.D.T. is sure that, but for the publicity campaign, passenger carryings would have increased faster than they have done. At home the Select Committee on National Expenditure recommended in March that further efforts should be made to impress on the public the paramount importance of travelling as little as possible and also suggested that plans for the compulsory staggering of holidays should be formulated. The committee apparently assumes that the existing train services will continue, but the military situation may soon lead to the curtailment of many services, though it may reduce the use of ordinary trains by members of the Forces.

In wartime, essential freight traffic takes priority over civilian passenger business and its efficient movement is the main task of the railway operator. Much attention has been paid to the improvement of the average wagon and train loads. The first Order issued by O.D.T. in March, 1942, prescribed minimum weights for wagons with less-than-wagon-load freight, beginning at 6 tons and rising in the autumn of that year to 10 tons. As

a result, the average wagon load of this class of freight increased by 15 per cent. In the case of traffic ordinarily passing in bulk, a second Order prohibited the railways from despatching wagons not loaded either to their marked load limit or to their full visible capacity. These Orders were evidently effective as the wagon load rose from 31·8 tons in 1942 to 33·5 tons last year: the second figure is a record and means an advance of 24·5 per cent. on the 1939 load of nearly 27 tons. Our average wagon load is about a fourth of the American figure and is stated to have gone up by 9 per cent. over the same period, but we have not seen precise figures. We have been told also that the average British train now carries 3 more loaded wagons, an increase of 13 per cent. This is insignificant progress compared with the jump in the American train load from 813 tons in 1939 to 1,116 tons in 1943, an increase of 37 per cent., even allowing for the fact that U.S.A. statistics are based on short tons.

Another matter of first importance is the prompt turn-round of wagons. During the years of dull trade in the '30's there was a surplus of wagons everywhere. The railways ceased to replace obsolete vehicles and their total wagon stocks decreased substantially. When traffic increased with a rush after the outbreak of war, shortages would have been serious if steps had not been taken to intensify wagon user. In tackling this problem the American railways have had the benefit of hearty co-operation on the part of the Shippers' Advisory Boards which set up local Car Efficiency Committees covering more than 700 important forwarding points. Through these committees the traders themselves see that wagons are kept moving and are used for transport and not for storage. Average wagon-miles per day have risen steadily from 41 in 1939 to 52 in 1943, or by nearly 27 per cent. Yet on the average round trip taking just over 17 days, the wagon moved in trains for only 2 days and 8 hours, occupying nearly 15 days in loading, unloading, shunting and standing in sidings. Last year the average length of haul, already tremendous compared with our transits, increased by 10 per cent. or thereabouts to 854 miles, of which 543 were loaded and 311 empty. All these figures indicate a great and growing strain on wagon supply and the need for still more co-operation with the Shippers' Advisory Boards.

We cannot point to any organisation of a similar nature amongst our own traders. Early in the war a good deal of friction was caused by the action of M.W.T. in tightening the demurrage regulations with the object of getting wagons liberated quickly. On the other hand, many individual firms made praiseworthy efforts to release wagons promptly. Some influential trading associations have also worked loyally with the railway companies in regulating the flow of traffic, in assembling full train loads, and in extending the system of "nominated loadings" so as to work more traffic straight to destination and reduce the amount of tranship traffic. Half way through the war the Railway Executive Committee reorganised the distribution of freight rolling stock by establishing a Central Wagon Control which watches the user of all types of wagons and detects any wastage either by traders or by railway staff. M.W.T. has also sponsored a campaign urging wagon users to improve the turn-round of stock, but it is open to doubt whether advertisements and posters will have much effect. Personal contacts, such as the American railwaymen have developed, might produce better results. In the States the appeal of red-hot statistics is well understood. The support of the Shippers' Advisory Boards is secured by putting them on their mettle to forecast traffic trends at least once a quarter and then letting them have the actual forwardings week by week. The regular circulation of other statistics and the publication at suitable times of frank statements about railway policy also help to smooth relations with the American public.

So much for history. Looking forward, there is every prospect of transport being in greater demand than ever during the rest of the current year. Unhappily, as reported in our issue of March 24, Mr. J. B. Eastman has not lived to see the full fruits of his work as Director of Defense Transportation. In one of his last announcements he said emphatically that a critical period lay ahead. O.D.T. was asking the railways and the traders to increase by another 10 per cent. the efficiency of their use of equipment. It would be possible to advance far towards this goal if the best methods in use anywhere were adopted everywhere, and if both traders and carriers would be foresighted in their practices, sacrificing their own convenience and putting aside individual advantages. Time will soon tell whether Mr. Eastman's faith was well founded. Competent authorities estimate that there will be an advance of 5 per cent. in the United States index of production for 1944. This may mean an increase of from 2 to 5 per cent. in railway ton-miles and the railways should get over this new peak if their staff is not unduly weakened and if they receive adequate supplies of material and equipment.

Coming back to the homeland, we find the Committee on

National Expenditure saying that, not only should there be a cessation in the call-up of railway workers, but that a steady influx of labour should be directed to the railways. The committee thinks that there is a sufficient supply of locomotives and wagons to move a considerably greater volume of traffic but for the fact that the manpower is not available. Some time ago congestion arose on the railways because of a shortage of locomotives. The companies now have on loan a large number of "austerity" and American locomotives, but cannot always provide enough enginemmen to make full use of the motive power at their disposal. The consequence is that traffic restrictions have had to be imposed from time to time, and in view of the difficult coal situation it is especially regrettable that filled wagons have occasionally been left standing too long in colliery sidings. Our railways have been working under a continuous strain for 56 months on end and may have to meet further abnormal demands at an early date. The calls on their resources will be more direct and more variable than any pressure which is likely to fall on the North American systems. It is therefore of vital importance that our lines should be kept free from traffic blocks during the anxious weeks of waiting for the decisive hour to strike. When the crucial period of the war does begin, we are confident that, with a clear start, the skill and grit of our railwaymen of all grades will prove equal to any and every effort required to meet the emergency.

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The First of the Exeter Expresses

ONE of the results of the drastic paper restrictions imposed during these years of war, has been our inability to deal adequately in these pages with many interesting centenaries, for in the 'forties of last century much was happening in the railway world that is worthy of recall. One such event, which occurred on May 1 a hundred years ago, cannot easily be ignored, however, as in it was the genesis of the fine speed tradition set up by the West of England express trains of the Great Western Railway. The occasion was the completion of the main line of the Bristol & Exeter Railway, which had been promoted by a party of Bristol merchants soon after sanction had been obtained for the construction of the Great Western line between London and Bristol. The Act authorising the Bristol & Exeter Railway was obtained on May 19, 1836, and, almost as a matter of course, Isambard Kingdom Brunel, who had done so much work in Bristol and had been appointed Engineer of the Great Western Railway, was selected as Engineer for the new undertaking. There was no mention of gauge in the 1836 Act and, as was to be expected, the Bristol & Exeter line was built to Brunel's broad gauge (7 ft. 0½ in.) like the Great Western Railway.

Work upon the railway was begun in due course, but difficulties of various kinds (not the least of which were financial) were experienced, and by 1840, in order to defer expenditure upon locomotives and other rolling stock, the Bristol & Exeter Railway Company leased its railway to the Great Western at a rental of £30,000 per annum and a charge of a farthing on every passenger and every ton of coal and merchandise. The lease was to apply from the opening to traffic of the first section of the railway, namely, between Bristol and Bridgwater on June 14, 1841, with a proportionate increase in the rent as further sections were brought into use. On July 1, 1842, the line was opened between Bridgwater and Taunton, and on May 1, 1843, between Taunton and Beambridge (beyond Wellington). The final section, thence to Exeter, being completed in the spring of 1844, the whole line was ready for opening on May 1 of that year. The lease was to remain in force until five years after the whole railway had been completed.

Celebrations were on the lines of earlier "openings"; there were the usual local festivities, including a luncheon in the Exeter goods shed. With the leasing of the railway to the G.W.R., a junction had been laid in between the two railway systems at Bristol (Temple Meads) so that for the first time it was possible to arrange for running a through train from London to Exeter, a distance of 193½ miles, something without precedent in railway history, and it was decided that such a train should be the chief feature of the "opening" proceedings. Here, indeed, was an unique opportunity of showing what could be done in the way of fast long-distance train running on the broad-gauge track, and the occasion was particularly opportune as the controversy between Brunel's broad gauge and Stephenson's narrow (now standard) gauge was then working up into the "Battle of the Gauges" which it was to take a Royal Commission to settle.

It was felt that all eyes would be upon this train run, and doubtless everything that could be done was done to make it a

success. The locomotive selected for the journey was the Actæon, one of a batch of 16 engines of the "Firefly" Class designed by Daniel Gooch (G.W.R. Superintendent of Locomotives) and built by Nasmyth, Gaskell & Company, of Manchester, and delivered in 1841. The train, consisting of six carriages conveying a number of railway directors, officials, and guests, left Paddington Station with Gooch himself driving the engine at 7.30 a.m. on the morning of May Day, 1844, and, after a limited number of intermediate stops for taking-up further members of the party, replenishing the engine boiler, etc., the train steamed into Exeter Station at precisely 12.30 p.m., or 5 hr. after leaving London. Five hours for a train run of 193½ miles was indeed good going in 1844, but something even better was to be achieved on the return journey.

After the official reception and luncheon, with the usual speeches and congratulations, the return train left Exeter at 5.20 p.m. Gooch was again driving, and, after a fine run, he brought his train to a standstill at Paddington Station at 10 p.m., so the up journey had occupied (with stops) 4 hr. 40 min. Allowing, say, 15 min. for intermediate stops, this gives an average speed of about 45½ m.p.h. According to Acworth's "Railways of England," the average speed (exclusive of stoppages) of all railways in the country was about 21½ m.p.h. in 1845. Among the guests who returned by the train from Exeter was Sir Thomas Acland, M.P., who, on alighting at Paddington, went direct to the House of Commons and was able to rise in his place there at 10.30 p.m. and astonish the members by telling them that at 5.20 p.m. that same evening he had been in the City of Exeter, nearly 200 miles away.

This first throughout train run from London to Exeter and back was no mean achievement a hundred years ago, and the honours of the day went largely to young Daniel Gooch—then under 28 years of age—who had driven the engine for the whole of the double journey—a good turn of duty for any engineman at any time. Gooch has left on record in his Diaries his own account of that hectic day, and it cannot be better told than in his own words. He wrote: "It was a hard day's work for me, as apart from driving the engine a distance of 387 miles, I had to be out early in the morning to see that all was right for our trip, and while at Exeter was busy with matters connected with the opening, so that my only chance of sitting down was for the hour we were at dinner. Next day my back ached so that I could hardly walk. Mr. Brunel wrote me a very handsome letter, thanking me for all I had done, and all were very much pleased." Gooch had shown what could be done in the way of fast long-distance running in those days, and from March 10 of the next year trains were booked in both directions between London and Exeter in 5 hr.; only two months later the journey time was cut to 4½ hr., including five stops. Those were then, by far, the fastest railway trains, not only in this country, but in the whole world—and by a good margin.

Increased War Advance and Senior Railway Staff

ON April 20 it was announced that the N.U.R., A.S.L.E.F., and R.C.A., had concluded discussion with the R.E.C. Staff Committee of their claim for an increase of 12s. a week in the war advance payable to adult railway conciliation grades and had agreed to accept an increase of 5s. a week for adult workers, male and female, with appropriate increases for junior staff. The war advance payable to adult males in the wages grades will thereby be increased from 20s. 6d. to 25s. 6d. a week and for adult females from 16s. 6d. to 21s. 6d. a week; this is the second consecutive occasion on which the unions have succeeded in their application for adult males and females to be treated similarly. In the salaried grades, adult males will receive £66 6s. a year instead of the £53 6s. payable hitherto.

In contrast with the sporadic disturbances in other industries which have occurred in recent months over wages and conditions of employment, this speedy settlement is a further indication of the highly successful manner in which the machinery of negotiation evolved by the railway companies has stood the test of war conditions and both sides are to be congratulated on the maintenance of such amicable relations. It is understood that the increase will operate from April 17, and that the unions propose further to pursue their claim for an extension, after the cessation of hostilities, of holidays with pay from six to twelve days. Although no official announcement has been made yet on the point, we assume that, in the absence of any intimation to the contrary, the increase will apply only to the staff

already in receipt of war advance, that is, those in receipt of salaries up to £1,000 a year.

The White Paper recently issued showing the financial results of railway operation during 1943 gives some indication of the tremendous burden which is being so efficiently and smoothly carried by the railways and it must be patent to any thinking man that the responsibilities of the comparatively small number of senior railway staff whose salaries exceed £1,000 a year have greatly increased during the war. Many of this section of the staff are working very long hours without any additional pay. In addition, very few of them have been able during the war to take advantage of the annual leave to which they are entitled and, unlike the staff receiving up to £1,000 a year, they do not receive any payment for holidays which by pressure of work they are prevented from taking. We have previously expressed, and we reiterate, the view, that it would be an act only of bare justice to extend the war advance to this small but vitally important section of the staff, following the precedent adopted in the last war. With income tax at its present level, an additional £66 a year would make an appreciable difference to their net salary and be some recognition of the manner in which their present arduous duties are being accomplished.

Should reference be made to the effect which any such decision might have on the civil service generally, reference to our editorial of August 13, 1943, will show clearly that the conditions of employment of railway and civil service staff are so dissimilar as to afford no justification for seeking to apply to railway staffs during the war only those civil service conditions which are unfavourable to railway staff.

American Stations and Land Values

FROM time to time the large amount of central land in great cities at present occupied by railways forms the subject of consideration by town planning committees, by members of the general public, and, of course, by the railway companies themselves. The late Sir Aston Webb often urged that London traffic difficulties could be solved in the main by covering in the railways and making roads over them, and, in recalling this, a Member of Parliament with many years of experience as Chairman of a large industrial dwellings company wrote to *The Times* recently expressing the view that, were the same idea to be applied to some of the railway sidings and marshalling yards in London, sites for flats could be found in a number of central districts which would provide accommodation for many thousands of Londoners at easy distances from their work. With rail and bus services at their door, considerably increased time would be available to them for rest and recreation. Obviously, any such idea pre-supposes the electrification of the railways, as with steam traction it would be impracticable to have railway terminal and marshalling activities conducted in "cut-and-cover" tunnels.

Many descriptions have been published of the large terminal stations in the U.S.A., such as the Great Central and the Pennsylvania Stations in New York, and the Union Stations in Washington and Chicago, but very little emphasis has been placed upon the fact that, in making arrangements for such stations, the greatest possible attention has been given to real estate values, or what the Americans often term "air rights." In 1926, for example (the most recent figure which we have available), the rents received from shop and other property at the Great Central Terminal, New York, amounted to \$4 million, which was a sum more than sufficient to pay all the expenses of the station. For a shop 14 ft. x 16 ft. the United Cigar Company paid 10 per cent. of its gross receipts, with a minimum of \$5,200; this rent in 1926 amounted to \$18,700. All the main subways and passages are provided with shops on each side and are, in fact, arcades. Broadly, when a new passenger terminal is contemplated in the U.S.A. the responsible railway company buys up surrounding property well in advance of its requirements. In many instances, by co-operation with the City authorities, town planning schemes are embodied in the railway proposals, and in practically every case the railway is covered in so as to secure its building site value. We have a small-scale example of this in England, in the Snow Hill Tunnel, Birmingham, of the G.W.R., upon which attractive arcades were erected.

On pages 445 and 446 are illustrations of the Grand Central Terminal, New York, before and after the reconstruction and electrification of the railway in the vicinity of the terminus. It may be remarked that the large roofs over running lines which are an outstanding feature of many British and Continental

stations are not adopted in the U.S.A., where the platform cover, often of the umbrella type, is almost insignificant. There are no waiting rooms or other buildings on the platforms, but everything for the passenger is concentrated in a large concourse. Generally, similar arrangements were envisaged by the L.M.S.R. in the details for the reconstruction of Euston which it made known shortly before the war. In passing, it has often been remarked that there is enormous potential value in such stations as Liverpool Street, L.N.E.R., but it must be borne in mind that business and residential fashions change, and the site value of Liverpool Street is almost certainly very much less than it was 20 years ago, in view of the westward trend of business in London.

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The New Japanese Ministry of Transport

A JAPANESE Ministry of Transport was established early in October last by the amalgamation of the Railway Ministry with the Traffic Ministry. The former had existed since 1920, and before then the Japanese railways came under a Railway Board directly responsible to the Cabinet. There have been railways in Japan since 1872, but their importance in relation to war requirements was not recognised till the war with Russia in 1904. As a result, most of the Japanese main-line railways were nationalised. Goods conveyance was not of the same importance with the Japanese railways as with continental countries, mainly because of the facilities afforded by coastal shipping. The attention of the Japanese railways was thus focused on passenger traffic, and a substantial contribution to this was made by tourists from the United States, Netherlands East Indies, and Australia. The war with China, and now the general war in Eastern Asia, have resulted in a fundamental change in this policy, and the railways were called upon to face new and heavy goods-transport tasks to relieve the shipping tonnage previously available for traffic between the various Japanese islands, and on coastal service, which had been reduced to establish new communications between Japan and the territories occupied in the South, as well as for transport services in connection with the Armed Forces. Coal is now carried almost wholly by the railways, whereas before the war it was handled almost entirely by shipping. The other constituent of the new Ministry of Transport is the former Ministry of Traffic, established in 1885. This Ministry was concerned mainly with maritime problems, including traffic, ports, lighthouses, and cables. Its department dealing with the last-named subsequently extended its activities to all telegraph services, and, in more recent times, to electric power generally. As early as 1923, air navigation in Japan came under the control of this Ministry.

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Locomotive Axleboxes

THE subject of axleboxes generally for locomotives, and to a lesser extent for tenders, was covered comprehensively by Mr. E. S. Cox in his paper before the Institution of Locomotive Engineers on April 20, and of which a summary is given on p. 438. Mr. Cox provided a wealth of up-to-date information, much of which was released for the first time, although he confined his paper to L.M.S.R. practice, which, however, is sufficiently diverse to provide parallels to the types in use on many other railways. He also included a number of very interesting statistics, derived from analyses of locomotive axlebox failures in service. We now learn why the inside-cylinder locomotive is more troublesome, from the viewpoint of axlebox performance, than the outside-cylinder type. Tables and illustrations were given to show why lower resultant loading on the axleboxes can be realised with the latter than with the former. Mr. Cox shows a way of escape for the inside-cylinder enthusiast, however, namely, by adopting Stroudley's arrangement of crank axle, in which the inside cranks and the outside coupling-rod pins are on the same centres. The only modern engines with this arrangement are the inside-cylinder 4-6-0s of the former Great Eastern Railway, which are justifiably described by the author as "the only really successful inside-cylinder 4-6-0s in the country, as evidenced by their survival on important work," a fact which he considers significant. (Incidentally, in the ensuing discussion, Sir William Stanier said that the G.W.R. "Badminton" class also had this arrangement.) The progress in axlebox technique on the L.M.S.R. after Sir William Stanier's appointment as Chief Mechanical Engineer is of great interest. Four main types are in

use; the steel box with pressed-in brass is that selected for all new construction.

Some valuable findings on the method of applying white metal, and the optimum thickness of the white metal itself, are chronicled in the paper. The tendency for the white metal to spread under load was carefully studied, and it was found that it could be much reduced if the metal lining were made sufficiently thin. On the question of lubrication, much significance appeared to lie in the G.W.R. practice of dispensing with the upper pad and relying on under-pad lubrication.

The present aim on the L.M.S.R. is to produce axleboxes that will attain a mileage equal to that of the engine itself between boiler changes, which in the last normal year (1939) was 114,000. Much wear arises from dust getting between the axlebox and the wheel boss, an occurrence well-nigh impossible to prevent, especially when the engine is having the fire raked out on the ash pits. True, that is hardly a fair sample of normal conditions in this country; but, on the other hand, there are many countries with dry sandy soil where the abrasive effect of grit particles is severe, and an inventor who will produce a really effective dust shield is eagerly awaited.

Great interest attached to the data and illustrations relating to the roller bearings from the Turbomotive which, the author says, "have continued in excellent condition and without appreciable wear" (after 250,000 miles), and with almost negligible oil consumption. There is much food for thought in this very favourable report of their performance, on the only locomotive in this country on which we can make first-hand observations. In view of these results, the increasing adoption of roller bearings in other countries is easily explained, and it would be a good thing if more roller-bearing locomotives of various types were running in Great Britain, so that a more general statement could be made, for purposes of comparison with journal bearings. Mr. Cox made no attempt to be exhaustive on the subject of journal bearings. He eschewed descriptions of freak axleboxes which have passed into oblivion after a period of cheap notoriety, but kept firmly to well-established types which have all passed beyond the experimental stage. If progress in the suppression of hot boxes, initiated during Sir William Stanier's regime, continues, that nightmare of all enginemen will soon be a thing of the past.

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Repairing Railway Wagons

IN this issue we publish an article from a contributor on the subject of the repair of railway wagons. This contribution embodies ideas which may seem somewhat revolutionary but which we feel contain a large measure of common sense. There is no doubt that the humble railway wagon has by virtue of its very mundane nature been somewhat despised by the average railway mechanical engineer, but the fact remains that the large numbers involved make it of paramount importance from the point of view of economics. The slightest saving which can be effected is multiplied into astronomical figures and for this reason alone the whole question of wagon repairs should undergo the most searching analysis.

The writer advocates several things which might instinctively arouse opposition. For instance, the closing of old-fashioned uneconomic shops, and the erection, in their place, of a few modern establishments at strategic points. Even in wartime this is not an impossible proposition and the proof of advantage having once been given to the appropriate Ministries, the erection of shops could be as rapid as the light-steel hangars which are so quickly put up on aerodromes. In an era of labour adjustments this aspect of the question could doubtless be covered even more propitiously than in peacetime. The fact that wagons usually have been stripped by skilled repairers is also no insuperable difficulty to the change under new methods, to unskilled labour, for these simple operations. The use of unskilled and female labour has already been carried to far greater lengths during this emergency and the complete change of method is absolute justification for the "de-skilling" of the stripping operation.

The third point is perhaps the most controversial. Is it more economical to turn out a generally-repaired wagon with all new timbers instead of a mixture of old and new? The author is most definite that it is, and from records he possesses has deduced the fact that the admixture is in the long run an unwise policy. We consider this to be a contribution of the highest importance at the present time when not only is there an urgent need to conserve timber but there is the equally vital national necessity to keep wagons in maximum service. The economics of the matter must also be of great interest to the companies.

LETTERS TO THE EDITOR

(The Editor is not responsible for the opinions of correspondents)

"Another Alibi Gone"

April 17

TO THE EDITOR OF THE RAILWAY GAZETTE
 SIR,—It may interest you to know that the paragraph "Another Alibi Gone" in the Scrap Heap at p. 384, is actually recording a fact; but the originating motive of the decree was not that attributed to it by the *South African Railways & Harbours Magazine*. *Si non e vero e ben trovato!* The object was to provide office (especially Government office!) staffs, university students, etc., who presented themselves late for duty or lecture, with a credible witness to the fact that the train they had travelled by had been delayed in arriving.

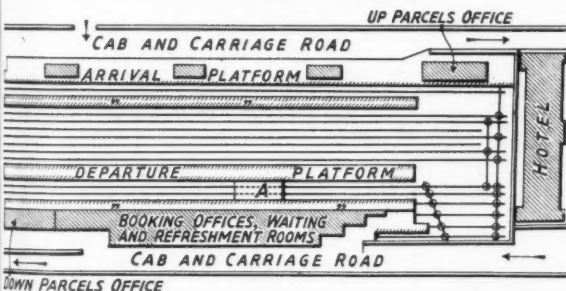
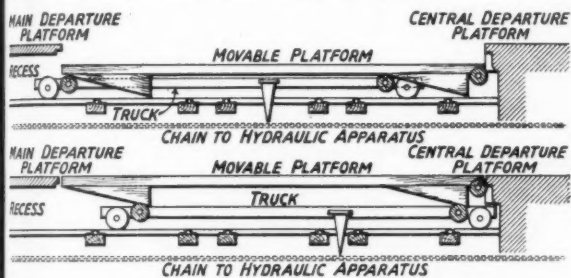
Yours faithfully,
 TALLERES

Sliding Platforms

Westminster, S.W.1.

April 21

TO THE EDITOR OF THE RAILWAY GAZETTE
 SIR,—The columns of your associated paper *The Railway Magazine* have recorded and illustrated in recent years examples of quite a number of movable platform sections. Three stations on the Great Eastern main line of the L.N.E.R. to Yarmouth are possessed of such sections, two of them, Saxmundham and Halesworth, necessitated by road level crossings intersecting the platforms. The other, Beccles, has a swing bridge type of moving platform to facilitate the transfer of milk churns and parcels from the down and branch-line platform to the up



Arrangement of movable connection between two departure platforms at Paddington, G.W.R., in 1878

platform. At all three stations these movable platforms, which are worked by hand, are interlocked with the signals.

Another type of movable platform is found at Wood Lane Station on the Central Line of the London Passenger Transport Board. It is on the loop platform which is used by trains terminating at Wood Lane. Some of these proceed to the depot but others, as many as 50 a day, continue round the loop to return to the other end of the line at Liverpool Street. With the introduction of longer trains in March, 1928, it was necessary to lengthen the loop platform, but this lengthening occurred just where the depot line joins the running line. A section of movable platform was therefore constructed on rollers so that it can be pushed out to a maximum distance of 3 ft. over the roadside rail of the depot line to provide the necessary platform face for the extreme car of the train. It is pneumatically operated from the signal box and is, of course, interlocked with the signals.

The outstanding instance of Paddington terminus, G.W.R., to which you made reference in your April 14 issue, almost certainly

was devised by Brunel. When the station was opened on January 16, 1854, it had one main departure platform, and an arrival platform (brought into use on May 29, 1854), separated by five storage roads. In addition, there were two subsidiary departure lines, served by an island platform having no permanent connection with the "mainland," as the present concourse space was occupied by small turntables to transfer rolling stock from one line to another. This island platform could be approached only by the movable platform, the scrapping of which, in the national interest, formed the subject of your original paragraph. The arrangement of this movable connection is shown in the accompanying drawings. The following account is extracted from a book called "Railway Appliances," by John Wolfe Barry, which was published in 1878.

"At the Great Western Station at Paddington, the booking offices are placed by the side of the main departure platform. A piece of cross platform (marked 'A' in one figure and shown in detail in the other), supported on a dwarf truck, is provided, which when required is drawn out by hydraulic machinery from beneath the main departure platform, and rises to the same level as the main platforms, becoming a bridge across the rails, and giving access to the second departure platform. The upper position in the sketch represents the platform drawn out on its truck from the recess by means of a chain connected to an hydraulic apparatus, and the lower position shows it raised to the level of the platforms on each side. The raising is effected by continuing to haul on the chain after the truck has come out of the recess, which causes the two rollers (shaded in the sketches) to travel along the lower surfaces of the inclined planes fixed below the platform. Small rollers at the end of the platform relieve the friction between the movable platform and the side of the central platform. By the use of this movable platform three long trains can be loaded at once, if the two trains nearest the booking offices be temporarily cut in halves. When it is necessary to despatch these trains, the movable cross platform is run back to its position beneath the main platform, the first half of the train is backed and coupled up to the second half. Trains of shorter length can be loaded and despatched, when the movable platform is raised. The position of the booking offices, near the centre of the departure platform, is no doubt convenient, as passengers approach the train near its centre; and though there is some inconvenience in the use of a movable platform, the arrangement answers well for a terminal station like Paddington, where trains are not very frequent, while the central position of the booking offices is certainly advantageous where the amount of passengers' luggage is large."

Yours faithfully,
 CHARLES E. LEE

"Back to Work, Please"

London. April 21

TO THE EDITOR OF THE RAILWAY GAZETTE
 SIR,—With regard to the article "Back to Work, Please" on page 410 of *The Railway Gazette* for April 21, I agree with the writer that these luncheons and similar functions serve a useful purpose and I agree with him that the speeches are usually pretty awful, but I do not agree that the time before lunch is wrong. This is the one feature of the luncheons which is valuable as this enables people to get into touch with each other and have a friendly talk, and I have often thought that these functions should start at 12 o'clock for 1 p.m.; the speeches, as the writer says, would be cut short afterwards and restricted to humour mixed with personal reminiscence.

I do not agree with the writer about the earnest desire of everybody to get back to their office early. These luncheons are not so frequent that any man who is any good as an organiser cannot spare the time to attend them, or must hurry back to see that his staff is at work.

Yours faithfully,
 EPICURUS

RAILWAY CONSTRUCTION IN ECUADOR.—According to U.S.A. reports, the Sibambe-Cuenca Railway, owned by the Government of Ecuador, has now been extended from Tampo to Azogues (5 miles beyond Bibian), a distance of 28 miles). Azogues is connected with Cuenca by a paved section of the Pan-American Highway. The Sibambe-Cuenca Railway leaves the Alausi River Gorge at Sibambe (where it effects a junction with the Guayaquil & Quito Railway) at an elevation of 5,925 ft. The route winds over mountain ranges to attain a maximum altitude of 10,646 ft., a net climb of 4,721 ft. There are long and steep gradients ranging from 1 in 25 to 1 in 33; the maximum gradient is 1 in 18. This 3 ft. 6 in.-gauge railway was indicated on the map accompanying our article on the railways of Ecuador, published in our issue of November 19 last, page 505.

The Scrap Heap

While working in a first class sleeping car at Cricklewood sheds, Mr. F. M. Childs, carriage repairer, found a pearl necklace, which he at once handed in. He has been rewarded with a cheque for £20.—From "The Evening News."

In a little over four years Britain's railwaymen have contributed nearly £298,529 in pennies to the Red Cross Penny-a-Week Fund. Totals for each of the four groups are: L.M.S.R., £114,446; L.N.E.R., £109,113; G.W.R., £40,302; S.R., £34,482. Staffs of Northern Ireland railways have contributed £186.

Since the beginning of the war, some 200 container loads of artistic and historical treasures from the National Gallery, the British Museum, and other national institutions have been conveyed by the G.W.R. to places of safety in country houses and special underground storerooms in remote parts of the country. This dispersal of "Old Masters" began immediately war was declared.

TWO LIVES FOR TWPENCE

Two people—an American soldier and a young English girl—are dead. They were killed by a train at a railway station. Their lives were sacrificed for twopence—the cost of two platform tickets. The story was told at a Bristol inquest recently. Two girls went to Temple Meads Station to see two sailors off by train. The girls did not buy platform tickets. When the sailors had gone the girls met two American soldiers, who offered to take them home. The girls agreed. But they had no platform tickets. The four set off to cross four sets of railway lines to reach an exit by which they could get out without the

girls paying. One girl jumped on to a line as a train was coming forty yards away. One of the soldiers jumped down to try to save her, but seeing the train so close, they were both too frightened to move. The train stopped, but it was too late. The soldier was dead. The girl died in hospital next day.—From the "Sunday Pictorial."

FED UP

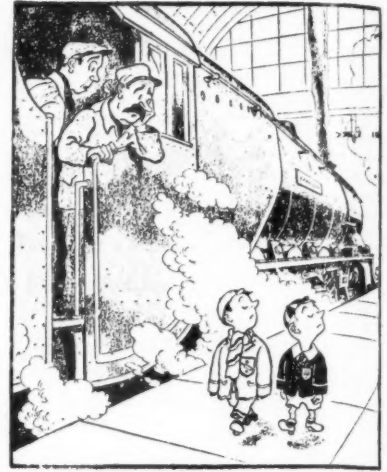
The station was apparently deserted and a little bow-legged man ran up through the entrance hall, seized a cap marked "Porter," swept the platform, checked some luggage, gave the cat its milk, and dived into the Porters' Room. From here he appeared with a cap marked "Signalman," dashed to the box at the end of the platform, pulled all the signals for the down stopper and again dashed into the Porters' Room.

This time he appeared in a cap marked "Inspector," moved rapidly and efficiently round the platform; looked into the waiting rooms to see whether the work he had done as porter was satisfactory, and he again dived into the Porters' Room, and as the train drew in, turned out in the full glory of a hat marked "Stationmaster"; did the honours of the place and gave the guard the right-away.

Almost before the train had left, he again dashed into the Porters' Room and came out wearing a hat marked "Ticket Collector." By dint of a short but even-time sprint, he reached the exit gate at the end of the platform before the passengers; collected their tickets and returned to the Porters' Room.

When he next emerged he was wearing a hat marked "W. H. Smith & Son," and he proceeded to open up the book-stall. A passenger, thinking such effort worthy of patronage, strolled up and said: "Have you the Life of Julius Cæsar?" The answer, "No, a regular ruddy dog's life," explained quite a lot.

By RODD



"They all want to be fighter pilots when they grow up nowadays"
[From the "Sunday Dispatch"]

[The idea conveyed above is certainly not the experience of our associated publication, *The Railway Magazine*.—Ed. R.G.]

The restricted issue, in Ceylon, of railway tickets to certain stations on days of popular festivals has checked considerably the usual increases in pilgrim traffic, but is reported to have given rise to illicit dealings in tickets. On the days in question "traffickers" purchase as many tickets as they can early in the mornings. They re-appear on the scene later in the day, at a time when there is a scramble at the booking offices and the sale of tickets for the day is about to terminate. Masquerading as sympathisers, they start negotiations, and obtain "fancy" prices for their tickets.

The railway saloon coach in which the remains of Cecil Rhodes were brought from Cape Town to Bulawayo for burial in the Matopos has arrived in Bulawayo, and has been presented by the board of De Beers Consolidated Mines to the Rhodesia Railways Limited. Mr. G. W. Smith, who took the coach out of De Beers' workshops forty-two years ago and coupled it to the train to fetch the body from Cape Town, is at present living at Riverside, Bulawayo.

TAILPIECE

(Some examples of station design are given on other pages)

The station of the future
A masterpiece will show
Of blocks in many floors above
And railway tracks below,
And shops and halls where passengers
Unjostled come and go.

The station of the future
Will tax the planner's brains
To build the perfect terminus
For all that's new in trains,
And platforms at an airy height
Designed for gyroplanes.

The station of the future
A model will be found
Of careful and intensive use
Of every foot of ground—
A model of amenities
To all the world around.

E. C.



"Well, officially you have missed the 4 o'clock, Sir, but by a piece of luck the 3.30 isn't in yet"
[Reproduced by permission of the proprietors of "Punch"]

OVERSEAS RAILWAY AFFAIRS

(From our correspondents)

VICTORIA

Value of the Burnley Flyover

The flyover at Burnley, to the east of Melbourne, which was completed last August to eliminate the crossover difficulties and delays with down Eastmalvern trains, has resulted in a considerable improvement in train running on both the main line and the branch lines. Brief details of this flyover, together with a sketch map and diagrammatic arrangement of the lines in the neighbourhood of Burnley Station, were published in *The Railway Gazette* of January 7 last (page 9). The following table shows the late running for a period of 6 days before the completion of the flyover, and for another period of 6 days after it had been brought into service:—

Eastmalvern Line Up Trains	Before	After
Daily average per train run ...	1-5 min.	0-9 min.
Morning peak ...	1-3 min.	0-8 min.
Box Hill Line Up Trains	Before	After
Daily average per train run ...	1-4 min.	1-0 min.
Morning peak ...	1-0 min.	0-6 min.

The actual improvement in train running on these lines is not the only benefit for which the flyover is responsible. Better timekeeping has also resulted all along the routes concerned, particularly across the viaduct to the Coburg terminus, and in the handling of traffic at Nos. 6 and 7 platforms at Flinders Street Station, Melbourne.

NEW SOUTH WALES

Locomotive Coal Consumption

Since the commencement of the current financial year on July 1, 1943, considerable difficulty has been experienced by the New South Wales Government Railways due to coal shortage. From July to October locomotives were burning between 30,000 and 31,000 tons of large coal each week, but, with the gradual depletion of stocks within the Commonwealth, the Administration took steps in the latter month to reduce weekly consumption by 3,000 tons. As a result it was necessary to reduce passenger, and, to some extent, goods, services. These reductions had the effect of restricting the conveyance of certain civilian goods, and of increasing the loading of passenger trains.

In November the Commonwealth authorities expressed a wish that the N.S.W.G.R. should save 8,000 tons of coal a week. After considering the effect of so drastic a reduction on the civil life of the community, the Commissioner for Railways, New South Wales, made representations to the authorities concerned; and eventually it was agreed that endeavours be made to save 1,000 tons a week in addition to the 3,000 tons for which provision already had been made. To effect this saving, it was decided substantially to curtail passenger services, with effect from November 21.

Goods and Passenger Traffic

Certain important categories of goods traffic have had to be rationed in respect of wagon supplies. These are crude ores (of which over 1,000,000 tons were transported yearly), minerals (850,000 tons), wool (1,280,000 bales), and general merchandise (750,000 tons). The carriage of coal, livestock, grain and flour, and foodstuffs is not rationed.

Despite coal and wagon-supply difficulties, however, more passengers were conveyed during the first six months of the current financial year than in the corresponding previous period, and, by better loading and quicker turn-round of wagons, and more economical use of engine power,

the tonnage of goods carried slightly increased. Comparative figures for the five months ended November 30, 1942, and 1943, are given below:—

	Five Months, July to November	1942	1943
Passenger journeys ...	96,224,056	102,595,725	(Increase 6,371,669)
Goods tonnage ...	8,093,808	8,160,335	(Increase 66,527)

CANADA

Wagon Loadings in 1943

A report presented at a recent meeting of the National Advisory Committee on Railway Carloadings, under the Chairmanship of the Transport Controller, Mr. T. C. Lockwood, shows that in 1943 Canadian railways loaded about 100,000,000 tons of revenue freight in 3,452,000 wagons, compared with 91,684,000 tons in 3,388,000 wagons during 1942. It was announced later that the Committee was studying ways and means of securing further utilisation of wagons, which would necessitate still heavier loadings and quicker turn-round. It was essential that the best use be made of all the equipment now in use.

C.N.R. Refrigerator Vans

At the monthly meeting in January of the Staff Service Club of Montreal, Mr. J. L. Townshend, General Superintendent, Perishable Traffic, Canadian National Railways, gave an address on the handling of perishable traffic on his system. He said that although improvements had been effected in the construction and insulation of refrigerator vans since 1895, practically no changes in design had been made until 1937, when the Canadian National Railways had introduced a van with ice carried overhead. Side flues and floor racks had been added since to provide better circulation of cold air, and that had been responsible for the efficient conveyance of heavier perishable loads. Tests had proved that there was a temperature at which each perishable commodity was preserved best, and in the newest Canadian National vans the temperature inside could be maintained whatever the weather conditions. During the winter specially-developed underslung heaters with draught control were used on refrigerator vans, and were carefully checked at inspection plants.

Express Employees' Wages

The National War Labor Board recently considered a request by the Brotherhood of Express Employees for an increase of \$20 a month in the basic wage rate of the Canadian Pacific Railway express employees in Canada. About 2,630 persons are affected. The spokesman for the Brotherhood said that no increase in basic rates had been granted to C.P.R. express employees since 1920. He asked that the requested increase be made retroactive to June 1, 1943. He added that the present wage rate of the employees was \$105 a month plus cost-of-living bonus, and that they found the rate low when consideration was given to the increased amount of business they had had to deal with in recent years. The increase in the cost-of-living was another factor which had prompted the application.

The President of the Canadian Pacific Express Company said that the rates paid were not low in comparison with other similar occupational classifications. They had been established by agreement in 1929, and since then pay adjustments had been made for some positions, and positions had been created. An employee with more

than ten years' service received a long-service bonus of \$5 a month, and one with 20 years' service received \$10 a month.

UNITED STATES

Enlarging Tennessee Pass Tunnel

After long being hampered by the limited dimensions of the tunnel under Tennessee Pass, on its main line from Pueblo to Salt Lake City, the Denver & Rio Grande Western Railroad has obtained authority from the U.S. District Court and the War Production Board to begin construction of a concrete-lined tunnel to the south of the existing one, at an approximate cost of \$827,000. The new bore will be 23 ft. high and 16 ft. wide, compared with the 17 ft. 10 in. by 14 ft. of the present tunnel, and will be 2,550 ft. long, or 26 ft. shorter than the latter. It will be level throughout its length. It is planned, after completion of the tunnel, to enlarge the old one to the same dimensions, and thus to double the line over the pass.

The Tennessee summit, 10,240 ft. above the sea, is the highest level on the Royal Gorge route of the D.R.G.W.R., and to reach it trains have to climb 3,190 ft. in the final 66 miles from Salida. It was to relieve this route, as well as to cut 175 miles off the journey from Denver to Salt Lake City, that the Moffat Tunnel route was built by the Denver & Salt Lake Railway, a subsidiary of the Rio Grande Western. Doubtless the recent closure of the latter for over ten weeks, due to the destructive fire in Tunnel No. 10, which involved diversion of all through traffic by the Pueblo and Royal Gorge route (see the February 18 issue of *The Railway Gazette*), has been an important factor in hastening the decision to enlarge the Tennessee Pass Tunnel.

Slipping on a Gradient

Sliding down a 1 in 16½ gradient, due to lack of adhesion, was the cause assigned by the representative of the Interstate Commerce Commission for an accident which occurred on the Pennsylvania Railroad at Madison, Indiana, on October 25 last, and resulted in the derailment of an engine and nine wagons of an 11-wagon freight train, and the death of an employee. The tender, which was not derailed, was leading. The gradient, 1½ miles long, varies in steepness from 1 in 19½ to 16½, and rules governing its operation lay down that specially-equipped locomotives shall be worked tender first at the head of each train, and that vacuum, air and hand brakes shall be used, with retaining valves set, to restrict speed to 6 m.p.h. On the day in question all these rules were being observed, but an accumulation of grease, oil, and leaves on the track, together with the damp conditions produced by a thick mist, so reduced adhesion that the train skidded, and attained a speed of 35 to 40 m.p.h., resulting in derailment on a 20-ch. curve within Madison yard limits.

Some 5½ hr. after the accident a second freight train, which also was operated in accordance with the rules, and on which the driver reversed his locomotive and had all sand-pipes in use, got out of control, slid down the gradient for 2,000 ft., and collided at between 40 and 50 m.p.h. with the wagons already derailed.

The Commissioners found that the use of hand-brakes in controlling the speed of trains is a violation of the Safety Appliance Law, and should be discontinued; and that, as the engines of both trains were in good order, and there was no evidence of track defects (other than a rail obviously broken by the derailment), the company should conduct tests to see how the incline may be negotiated safely in all conditions with the use of power-brakes only.

Locomotive Axleboxes

Summary of paper by Mr. E. S. Cox, M.I.Mech.E., M.I.Loco.E., Chief Technical Assistant, Chief Mechanical & Electrical Engineer's Department, L.M.S.R.*

IN 1939, the last normal year, there were 87,914 axleboxes on the 7,508 steam locomotives in stock on the L.M.S.R. and 43,476 of these were coupled axleboxes. The design, manufacture, operation and maintenance of this large number of bearings is an important part of the work of the Mechanical Department, especially in the case of the 50 per cent. of the total represented by coupled boxes, which are subject to such a variety of fluctuating forces as to render them something quite apart from journal bearings as normally understood in engineering practice. The service given by these axleboxes is one of the major controlling features in locomotive availability.

Three principal factors directly affect such availability so far as axleboxes are concerned:—

Rate of wear.

Number of failures in traffic—almost entirely in the form of hot boxes.

Time taken for repairs.

Unless otherwise stated the paper refers to L.M.S.R. practice and it is confined, with one or two exceptions, to the period before the present war.

Whereas on carrying wheel bearings of all kinds the pressure per sq. in. of projected area due to the static weight of the vehicle is the measure of journal loading, in coupled axleboxes the maximum pressure is increased and altered in point of application by the loading due to piston thrust when steam is on. To express the piston thrust effect in a representative way is far from easy, as it varies throughout each stroke as the steam is expanded, and also from time to time throughout a run as speed, steam-chest pressure and cut-off vary. None the less this piston thrust effect can produce and sustain for long periods a resultant load on the bearing not only several times that due to vertical loading alone, but acting in the case of certain designs, in a direction not many degrees above the horizontal centre line, being resisted by a portion of the bearing usually ill fitted to take it.

Nearly the whole of the piston load, modified by the leverages, is transmitted through the driving boxes of inside cylinder engines, no matter how it is subsequently divided up among the other coupled wheels. In the case of the outside-cylinder engines the effect of piston load in the plane of the driving box is greater than for inside cylinders because of the transverse leverages across the engine, but of that greater load, part is distributed direct down the side rods to the other wheels, and only part comes on to the driving box. Final resultant loads are thus somewhat lower in the latter case.

There is thus a small but clear advantage for the outside cylinder arrangement based on maximum values alone. The average value of the loading throughout a revolution is more markedly in favour of outside cylinders. If for each angular position of the crank, the value of the resultant of vertical load and piston thrust be plotted for one revolution, the area beneath the curve can be used as a comparative "work factor."

This improvement is large if advantage is taken of the outside cylinder arrangement to provide longer bearings. For the sake of standardising axlebox sizes, this has not

always been done; and the inside cylinder bearing length is limited by the presence of the crank axle. A length of 11 in. is usual on recent L.M.S.R. design, and with axleboxes 8½ in. by 11 in. the maximum bearing pressures on the outside cylinder engine become 558 and 499 lb./sq. in. for r.h. and l.h. boxes respectively, a reduction of 35 per cent. over the average for the inside-cylinder driving boxes.

There is another way in which the resultant axlebox loading is more severe with inside cylinders and normal disposition of cranks. The angle at which the resultant load acts varies throughout each revolution but not at a uniform rate. With inside cylinders it acts for nearly half a revolution within a range of angles averaging not more than 30 deg. above the horizontal centre line. It then rapidly reverses to produce a similar concentration of loading on a relatively small angular range on the opposite side of the bearing. In other words, the box takes a pounding down near the horizontal centre line and is only momentarily loaded on the vertical centre line, under the particular conditions of working in question.

For outside cylinders conditions are more favourable and the angle at which the resultant load acts passes fairly evenly round the surface of the bearing and back again during the course of revolution.

The inside cylinder engine is at a disadvantage, but it would not be correct to condemn it out of hand. If the bearing pressure on such engines could be made as low as on outside cylinder engines, other things being equal, there should be no difference in their bearing performance. There is a way of approaching this, by placing the coupling rod crank pins on the same centres as the adjacent connecting rod cranks—in other words to apply to inside cylinder engines the same relative disposition of cranks and side rods as obtain with the outside cylinder arrangement.

The resultant loadings are more in line with outside cylinder values, but three objections can be raised to its adoption:—

(1) More revolving balance weight is required in the wheels, since with the ordinary arrangement the big end and portion of connecting rod partially balances the weight of the side rods. This increase may be 800 lb. on a large 0-6-0 engine and takes the form of unsprung weight.

(2) The bending moment in the crank axles is increased, and the stress in tons per sq. in. may increase accordingly by as much as 50 per cent.

(3) The inequality in loading between the boxes on the two sides of the engine is increased.

Four different types of coupled axleboxes are fitted to L.M.S.R. locomotives:—

Steel with pressed-in brass.

Steel or wrought iron with loose brass.

Manganese bronze.

Solid bronze.

The question may be asked as to why such a diversity of axlebox types persists in relatively large groups, and why conversion has not been undertaken so as to standardise the best type. The answer is that unless a clear improvement in bearing performance is to be obtained, the change cannot be justified financially. Experience has shown that where bearing pressures are excessive,

no variation in the design of the box is much help in reducing wear to numbers of hot boxes. Where bearing pressures are low, bearing performance, although not up to modern standards, is not in general bad enough to give scope for enough improvement to pay for the change.

Whatever the general design of the axlebox, the arrangement of the bearing surface itself regarding the extent and thickness of the white metal lining can be independently varied. For many years the deep pocket shrouded with brass all round held the field. This deep pocket allowed the brass to be re-bored from successively higher centres a considerable number of times before the white metal eventually became too thin. On the other hand it was not customary to machine the bottom of the deep cast-in pockets, so that bonding of the white metal to the brass was often very poor with subsequent failure of the bearing.

In 1932 Sir William Stanier brought on to the L.M.S.R. the conception of the thin layer of white metal not shrouded at the sides but only at the ends, thus allowing the brass to be machined before the metal was applied to ensure a perfect bond.

The shrouding all round, previously necessary to prevent the thick white metal from spreading under load, was no longer necessary as tendency to spread almost vanishes if the metal lining is sufficiently thin.

Some controversy has surrounded its application to the heavily loaded bearings; the claim is made that as the metal were thin under the constantly repeated blows due to piston load, the presence of the serrations initiated disintegration of the metal. This is very difficult to prove or disprove, many white metal surfaces "caught in the act" showing crumbling in lines at right-angles to the serrations.

Improvements in bonding due to research in methods and control do, however, seem to avoid the need for serrations altogether, and the latest L.M.S.R. arrangement has metal, ¼ in. thick, bonded to a plain machined surface.

The main points in lubrication are:—

(a) Quality of oil.

(b) Method of supply, that is, trimming feed or mechanical lubricator.

(c) Method of application to journal.

"General axlebox" oil is still the general standard which has proved satisfactory with all normally loaded bearings, and is the oil associated with the good bearing performance given by the modern steel boxes with pressed-in brasses. The use of this oil compounded with free fatty acid instead of rape was undertaken as a precautionary measure so as to have a ready alternative should there be any interruption in supply of rape under wartime conditions. With mechanical lubrication it can be said to have given fairly satisfactory results but with trimming feed some adjustment in the number of trimmings was found desirable since this compound has not in general such good syphoning properties.

A welcome reduction in hot boxes on overloaded bearings in the L.M.S.R. class "4" 0-6-0 goods locomotives, has resulted from the introduction of the "W" oil, compounded with 15 per cent. of rape, which was specially produced to meet the particular conditions of their work. Straight mineral oil is used on engines wholly engaged on shunting where runs are very short and average box temperatures are probably low, even although, with a high degree of full gear working, resultant box loadings are high.

Mechanical versus trimming feed is an issue which is still in the balance in British

(Continued on page 453)

* Read before the Institution of Locomotive Engineers in London on April 20

The Repairing of Railway Wagons

A plan for improved methods

By T. Lovatt Williams

THE repair of wagons in the service of the railway companies of the British Isles is such a vast undertaking that any analysis of the methods used must be of the highest value, for the slightest economies on individual wagons, multiplied by the numbers involved, will often reach quite staggering figures. This is clearly exemplified by the decisions, reached some years ago, to paint the company's lettering in miniature instead of the large designations hitherto used. The resultant economies greatly surprised everyone.

This contribution touches on much bigger issues and involves consideration of principles of wagon repairing which have been in vogue for years, but which nevertheless lay themselves open to criticism in view of the waste which ensues from these methods. It should be stated here that the arguments apply to the repairing of the common type of wagon of timber construction and the methods to which objection is taken are those employed at the smaller wagon repairing works and depots on the various lines.

It will be admitted generally that there are several considerations. Two of the major ones are the necessity for keeping wagons out in service as long as possible between repairs and the urgency of saving timber. These are both points of the highest national importance. But there are other items among which are the desirability of reducing the cost of wagon repairs and the concentration of this activity in the minimum number of shops and depots.

The system at present in use at a large number of repair stations is this. Wagons are sent in from the line after some defect or defects have been discovered by the examiners. Specifically the wagon proceeds to its nearest repair works or depot but, because of congestion, a delay in getting there is often involved. This represents loss of earnings and idle capital.

When the wagon is received in the shop, a foreman examines it more thoroughly and marks off all those items which are visible to him, and which need renewal or repairs. The wagon is then stripped by a wagon repairer (this fact must be emphasised) and as the stripping proceeds possibly more damaged or faulty items are discovered. The foreman returns once, or even several times, and marks off the extra items, so that each average wagon appropriates a fair amount of a foreman's time.

It is perfectly obvious that as the same repairer is responsible, and will be paid for the wagon he is engaged in stripping, the more items which are discovered for renewal the higher the amount he ultimately receives for the repaired wagon. This, although an advantage in one way, obviously is not an economic system of repairing, nor is it in accord with modern ideas. The fact of a skilled repairer being employed to strip a wagon is also an ill-conceived method, but one which has grown up over a course of years. From a piecemeal point of view so much is involved in the relation of stripping to erecting that it would be a far better practice to separate these items and employ a special but lower grade of men on the first. Moreover, this piecemeal system of stripping and repairing embodies a very poor policy from a technical point

of view in the mixing of new main timbers with ones of doubtful but not positively faulty condition. This results often in the wagons having to be returned to their works sometimes in two or three years for further main timber renewals, instead of remaining out for their prescribed eight years after general repair.

One actual case concerned a wagon which was thoroughly overhauled by these methods of mixing main timbers, and turned out as a "general" repair. Three years afterwards it was returned for new solebar, headstock, and middlebearer, and some of the former "new" timbers were damaged in the stripping and had to be renewed in addition. These methods will not stand up to analysis on an economic basis and certainly they cannot be afforded at the present time.

There is a further point but an extremely important one. Many of the railway wagon repair shops are old-fashioned, and repairs are undertaken under crude conditions. Poor lighting, insufficient room between the roads, antiquated appliances and lifting methods, all symbolise loss of output and ultimately loss of revenue to the companies.

The remedy may appear to be revolutionary but it should be recognised that we are living in an age of new ideas and in these matters the managements can prove that they are eager and willing to explore fresh fields despite precedent and tradition. In the consideration of wagon repairs by the suggested system it would probably be found that those coming under the "general" or "plated" category could be concentrated at a very few modern factories situated at vital points but the shops for light repairs would be available on their present sites.

A general repair factory should therefore be a specially constructed building placed at a strategical point on the line but not necessarily near to one of the existing large works for several obvious reasons. The whole of the premises could easily be under one roof, comprising stripping and assembling sections, wheel lathes, smithy, spray-painting booths, timber and iron stores, re-tying and axle department, and offices and the usual adjuncts.

All wagons received for general repairs or for more than a predetermined number of main timber renewals would go to the stripping section where the work of complete stripping would be carried out by labourers using the most up-to-date methods and taking advantage of the many types of nut runners and pneumatic tools now available. The whole wagon would be completely stripped by unskilled labour instead of the present piecemeal system carried out by skilled repairers.

"The sifting of the wheat from the chaff"—in other words, the inspection decisions would then be taken, not by foremen but by trained examiners, expert in judging the soundness of timber and at the same time able to deal with the condition of wheels and iron-work in general—both of the latter being simply a matter of conforming to certain stipulated standards. The sound main timbers would be then set aside to be transferred to outstations which urgently required them for light repairs, and all the good general planking would be available for use either

in the "general" repair factory, or, if there was a surplus, it is likewise transferred to where it was needed.

It will thus be seen that this scheme requires all generally repaired or "plated" wagons to comprise new main timbers—a policy which, under examination, fully justifies itself in that a sound and reliable wagon is turned out each time, and in it there are no unknown factors of age and decay which will result in a premature stoppage for another costly repair. Furthermore, there is no waste in putting aside the second-hand timbers for use at the outstations for it is common experience that these places usually cannot obtain enough of such material and consequently a high proportion of new wood is used.

One of the principal economies, however, lies in the use of the "ramp" method for re-assembling the repaired wagons. The system is entirely the same as the assembly of new wagons in which all the material for the frames is collected at one point and the timbers are forced together by hydraulic means. On a progressive basis the iron-work, drawgear, and wheels are added, followed by the planking and details dealt with from assembly platforms of correct height on which all possible sub-assemblies are ready at the right time. The cost of assembly operations in this manner is obviously much lower than by the cumbersome individual hand methods implied by the ordinary method of repairing, as can easily be ascertained by a comparison with existing "ramp" methods for new wagons.

There are thus four major factors in this proposition:—

- (a) The total use of new main timbers to ensure the full life of the wagon between general repairs;
- (b) The availability of more second-hand main timbers for the smaller depots;
- (c) The stripping of wagons by unskilled labour;
- (d) The assembly of wagons by "ramp" methods.

In themselves these would mean the saving of vast sums to the railway companies, but in addition it would mean that many out-of-date shops could be closed. The net result from both a railway and a national point of view would be immense, and the possibilities in this respect are so great that the companies would be well advised to open an investigation on these lines.

ALUMINIUM ALLOY SECTIONS.—The British Standards Institution has issued a new standard (B.S. 1161—1941) which covers aluminium alloy structural sections. It is intended as the first of a series to cover light alloy sections for use in various branches of engineering. The first series covers sections for general engineering purposes, and copies may be obtained from the Institution, 28, Victoria Street, London, S.W.1. Price 2s. each.

NATIONALISATION OF TUCUMAN TRAMS.—The Tucuman Tramway Company, an associate of the American Foreign Power Company, has recently been nationalised by the Tucuman Provincial Government, Argentina. The company is said to have refused the payment of taxes for a number of years. The original scheme to sell the company's assets by auction having been abandoned, so as to obviate any stoppages of the tram services, the Tucuman Provincial Government decided to nationalise the undertaking and take the operation of the services into its own hands.

L.M.S.R. Locomotive Casualty Report System—II*

Methods used for the reporting of, and dealing with, failures of engines

By Harold Rudgard, A.M.I.Mech.E., M.I.Loco.E., M.Inst.T.,
Superintendent of Motive Power, L.M.S.R.

INSTRUCTIONS for the working of the casualty system, which include the classification and coding of casualties, are given below.

Engine casualties are dealt with under five categories:

Definition of Engine Casualties

Category I

1. During the working of a train any defect developed in the engine or tender

irregularities irrespective of whether time has been lost thereby or not, where the engine is concerned.

Method of Reporting

A driver must specially report all cases of time lost by locomotive or engine failure during the working of his train, when he signs off duty whether he finishes at home shed or another shed. (Below is a specimen copy of the driver's report).

LMS—DRIVER'S REPORT.				Shed _____ 19__	
m. _____		Train, from _____		to _____	
on the _____ day of _____ 19__		Driver _____		Shed _____	
Load: (Regulation)	Delay, _____ h. _____ m.	Fireman _____		Shed _____	
	Eng. No. _____	Class _____		Guard _____	
(Actual)				Station _____	
SUBJECT _____					

Signed _____					

Specimen of driver's report

whereby the efficiency is impaired and time is therefore lost.

2. The failure of an engine, after being fired, to work its train to time through any defect which should have been found by the examiner or driver or was due to a concealed defect.

3. Fusible plugs, irrespective of whether time has been lost or not.

(Items 1 and 2 of the above are reportable to the Board of Directors of the company).

Category II

Will include casualties under the following headings where no time has been lost:—

1. Hot axle bearings which necessitate the removal of wheels, and hot tender axle bearings which necessitate removal of wheels or bearings.

2. Hot big or little ends.

3. Engines unable to return to owning depot with train booked through insufficient time to carry out the repairs necessary.

Category III

Will include casualties under the following headings where time has been lost, but it must be emphasised that particular care must be exercised to ensure that the delay is in no way due to any defect in the engine:—

Mismanagement	Slipping
Shortage of water	Shortage of coal
Overloading	Priming
Weather conditions	

Category IV

Will include all casualties where time has been lost due to inferior coal.

Category V

Will include all cases of steam heating

The report is to be handed to the running shift foreman who must satisfy himself that all the necessary information is given to enable the case to be properly reported. Brief particulars of time lost with all important passenger and freight trains and serious engine failures must be immediately telegraphed to Superintendent of Motive Power, Watford, and appropriate Divisional Superintendent. An examination of the engine must be made immediately (where possible) with a view to giving the correct cause in the telegrams.

Fractures

In all cases of fracture of any part of the engine motion or of an axle, wheel, tyre, or drawgear, whether there is any delay or not, a telegram must be sent immediately to the Superintendent of Motive Power, Watford H.Q., the appropriate Divisional Superintendent of Operation, the Chief Mechanical Engineer, Derby, and the Mechanical Engineer or Locomotive Works Superintendent, stating where the broken parts may be inspected.

Category I

A. An engine casualty report form giving as many particulars as possible must be made out at the shed at which the driver signs off. Against items on the report which cannot be completed, the words "To follow" or the name of the shed responsible for the information must be inserted. A note must also be made on the engine casualty report form that a copy has been sent to the shed or sheds concerned. Below is a specimen copy of the form used to complete an engine casualty report.

Copies of the engine casualty report

London Midland and Scottish Railway Company.

CAUSE OR EXPLANATION OF CASUALTY AND CONCLUSION.

Engine No. _____ Date _____ 19__ Delay _____ hrs. _____ mins.

NATURE OF CASUALTY

CAUSE OR EXPLANATION:—

STAFF:—

At fault _____

Recommendation: _____

Signed _____

District Loco. Supt. or Running Shed Foreman.

Date _____

Superintendent of Motive Power.

Engine casualty report form, to be completed at "signing off" shed

* Part I was published in our April 21 issue

LMS WEEKLY STATEMENT OF ENGINE CASUALTIES (MECHANICAL)										
MOTIVE POWER DEPOT _____ WEEK ENDED _____ 19__										
NUMBER OF ENGINES ALLOCATED <small>Passenger _____ Freight _____</small>										
DATE	ENGINE NUMBER	CLASS	SHED	TRAIN WORKED OR TRAIN WHICH SHOULD HAVE BEEN WORKED			DELAY	NATURE OF CASUALTY	REMARKS	Ref No
				TRAIN P - Passenger F - Freight	FROM	TO				

LMS WEEKLY STATEMENT OF ENGINE CASUALTIES (OTHER THAN MECHANICAL)										
DATE	ENGINE NUMBER	CLASS	SHED	TRAIN WORKED OR TRAIN WHICH SHOULD HAVE BEEN WORKED			DELAY	NATURE OF CASUALTY	REMARKS	Ref No
				TRAIN P - Passenger F - Freight	FROM	TO				

Specimen of headings on front and back of weekly statement of engine casualties

form are to be forwarded without delay as follows:—

- (1) One copy to the appropriate Divisional Superintendent of Operation (two in cases of fractures).
- (2) One copy to shed where disabled engine was left.
- (3) One copy to shed at which disabled engine is allocated.
- (4) One copy to shed at which driver is stationed.

B. The District Locomotive Superintendent or Running Shed Foreman of the shed where the disabled engine is left must have an examination made to ascertain the cause of the casualty, and after receipt of the copy of the engine casualty report form must send in letter form to the appropriate Divisional Superintendent of Operation the result of the examination and the cause of the casualty.

If a copy of the engine casualty report form is not received by this District Locomotive Superintendent or Running Shed Foreman within three days of the casualty, he must make out an engine casualty report form and forward copies in accordance with (1), (3), and (4) above, also a copy to the shed at which the driver signed off duty. In such cases the District Locomotive Superintendent or Running Shed Foreman of the shed at which the driver signed off duty must send to the appropriate Divisional Superintendent of Operation an explanation why the engine casualty report form was not initiated by him.

C. The District Locomotive Superintendent or Running Shed Foreman of the shed to which the disabled engine belongs, on receipt of the engine casualty report form, must forward to the appropriate Divisional Superintendent of Operation a letter giving all the particulars for which he is responsible.

D. If a casualty occurs in the district to which the engine and driver belong, the engine casualty report form, if possible, should be fully completed on both sides in the first instance. If this is not possible, the words "To follow" should be inserted opposite "cause of casualty" on the front side of the Report and the reverse side should be left blank. The reason why the case cannot be completed should be included under "Remarks."

E. In a case where the engine casualty report form has not been completed in the first instance, the report and all

letters connected therewith will be sent for conclusion to the shed considered responsible for the casualty. The reverse

side of the engine casualty report form must then be completed fully by the District Locomotive Superintendent or Run-

LMS Shed _____ Date _____ 19__ ENGINE CASUALTY REPORT

Shed _____	Engine No. _____	Class _____	Date _____ 19__
Driver _____	Fireman _____	Stationed at _____	
Shed _____	Ass. Eng. No. _____	Class _____	from _____ to _____
Driver _____	Fireman _____	Stationed at _____	
Train _____ m.	from _____	Load { Regulation _____ Actual _____	
Delay _____ Hrs.	Mins. At _____	and _____	
Nature of casualty _____			
Cause of casualty _____			
Part at fault _____		Last Heavy Repair in C. M. E. Shops.	
Date last renewed _____	Date _____	Shop _____	
Date last examined (Daily) _____	By whom _____	Shed _____	
" " " (Standard) _____	By whom _____	Shed _____	
Has this part been reported on _____		By whom _____	
any of the six previous trips } Date _____			
If so state:—What was done _____			
By whom _____		Date _____	Shed _____

Particulars of the six previous trips:—

	Date	Driver	Mileage	From	To
1					
2					
3					
4					
5					
6					

Engine { gave train up } at _____ to _____	Time Casualty Occurred _____
{ exchanged } for _____ Engine No. _____	

Dist. Loco. Supt.'s or Running Shed Foreman's Remarks and Summary of Driver's Report:—

Divisional Superintendent of _____ Signed _____
District Loco. Supt. or Running Shed Foreman.

[over]

Front of engine casualty report form

ning Shed Foreman (special care being taken to give under heading "Cause" particulars relevant only to the cause of the casualty) and returned as quickly as possible to the appropriate Divisional Superintendent of Operation.

F. Time lost and regained

In cases of time lost during one part of the journey being regained later on, this should be clearly indicated and the points given between which the time was regained.

G. Written reports from shed or repairing staff

Written reports from the shed or repairing staff are not to be obtained in connection with engine casualties. Drivers' reports or reports from foremen are not to be forwarded with engine casualty report forms, but must be summarised by the District Locomotive Superintendent or Running Shed Foreman and inserted to-

gether with his remarks in the space provided on the front of the engine casualty report form, or in the letter, when one is sent in accordance with the above instructions.

H. Casualties to engines working double-headed trains

In order to make it clear on the engine casualty report form when the assisting engine has failed, this engine number must be underlined with red ink.

J. Particulars of last general intermediate or service repair, last standard examination

Correct particulars as to date out of Chief Mechanical Engineer's Shops after general intermediate or service repair, and mileage since each class of repair must be given. In addition to giving the date of last standard examination, show in cases of examination on the mileage basis, the mileage run from the date of such exami-

nation to date of casualty, and mileage since last "X" examination and repair.

K. Fusible plugs fused

All cases of the above are to be reported on form E.R.O. 47987, shown on previous page, irrespective of whether time has been lost thereby or not. Disciplinary action must not be taken in these cases, but a recommendation sent to the Divisional Superintendent. Details of mileages for the last three washouts to be given, also any priming reported on the last six trips.

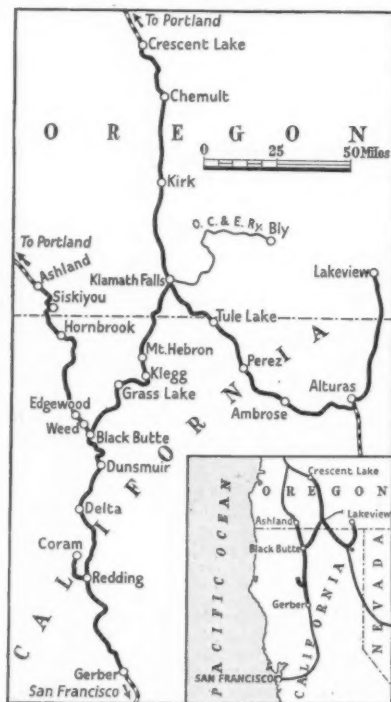
I. All casualties under Category I must be shown on the Weekly Casualty Statement E.R.O. 53921 for the district to which the engine is allocated in accordance with the instruction contained under the heading "Weekly Engine Casualty Statement E.R.O. 53921." A specimen copy of the weekly statement of engine casualties is reproduced on the previous page.

(To be continued)

Operating an American Mountain Division

Intensive working on the Shasta territory of the Southern Pacific

IN its issue of February 19 our American contemporary, the *Railway Age*, described how the Southern Pacific Company operates its Shasta division, which consists of 558 miles of single track in rugged mountain territory, with long



Sketch map of the Southern Pacific Shasta Division

stretches situated in the bottom of winding canyons. As shown in the map, the main line of 307 miles extends from Gerber, California, to Crescent Lake, Oregon. The divisional headquarters is at Dunsuir, 101 miles from Gerber, and the busiest section of line lies between

Klamath Falls and Chemult, Oregon, for this track is also used by the Great Northern to reach its Californian connection with the Western Pacific. At the southern end of the division a productive orchard district is served; in Oregon grain, potatoes, cattle and dairy products are put on rail; timber originates everywhere. Through traffic is heavy in spite of the deliberate diversion of certain trans-continental traffic to other routes so as to ease the burden of wartime movements.

At Gerber the railway is only 244 ft. above sea level and for some years before the war the Southern Pacific spent large sums on relocating 37 miles of line between Redding and Delta, so as to shorten the route by six miles, ease the curves and reduce the grades. From Delta the railway follows the canyon for 25 miles to Dunsuir, where it starts to climb by means of a hairpin loop and at Grass Lake, 46 miles further north, reaches its highest point, 5,106 ft. It then drops by 1,000 ft. to Klamath Falls, only to rise again to 4,778 ft. at Crescent Lake, where trains pass to the Portland division. On the branch line from Black Butte to Ashland grades are even heavier and the physical surroundings of all the lines entail unusual efforts to keep them open. Floods, snowstorms and gales are common: last winter snow ploughs were out north of Klamath Falls for 40 consecutive days. The permanent way is necessarily of solid construction; rail weighing as much as 132 lb. per yard is used in some places.

The standard freight locomotive on the division is of the cab-in-front 4-8-8-2 type, able to haul 4,000 tons on a fairly level section or 7,000 tons on a down grade, but rated at only 1,550 tons on the steepest inclines. Fast freight trains northbound from Dunsuir need four or five locomotives each and, to maintain a train load of between 4,000 and 5,000 tons, assistant engines of 2-10-2 type are attached to other trains on severe grades. Altogether, 109 oil-burning locomotives are assigned to the division. Their maintenance is difficult because of the excessive amount of braking involved and the flange wear on curves which often calls for the renewal of tyres every six weeks.

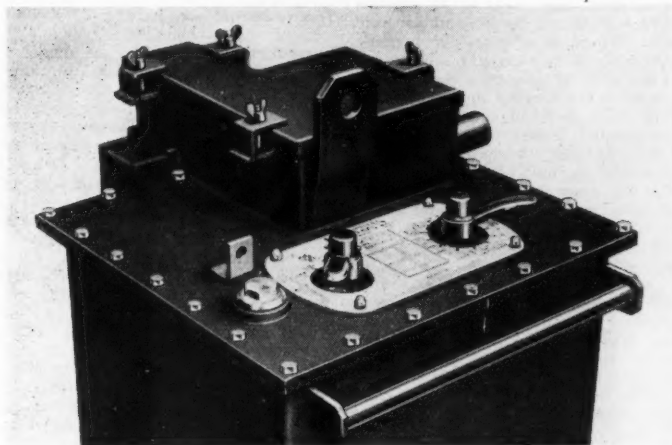
Normally about 400 enginemen are employed and it is planned to increase the shop force at Dunsuir by 300 men to carry out heavy repairs there.

The division is run by a superintendent with the aid of a division engineer, a master mechanic, four trainmasters, and two road foremen of engines. Three chief dispatchers are responsible for train movements. They have the help of centralised traffic control over the section of 80 miles between Redding and Black Butte. This installation is unique as it includes the first long stretch of new line built with passing sidings and other facilities to meet the requirements of central traffic control. The operating staff handles 534,835,000 gross ton miles (excluding weight of locomotives and tenders) in an average month. Recently traffic has grown at a phenomenal rate to at least 150 per cent. above the 1938 level. This year 47 per cent. more net ton-miles are being worked than in 1941, with an increase of only 6 per cent. in freight-train miles. Passenger business has also reached an unprecedented size. Passenger coach miles average over 1,500,000 a month, an increase of 27 per cent. over 1941, in contrast with a decrease of 8 per cent. in passenger train miles over the same period. This fine railway operating amongst the Northwestern mountains takes place on a division to which the epithet "Hot-shot" is applied. We understand that the performance has attracted wide notice amongst American railwaymen, and we are glad to give it publicity in this country by printing this digest of an interesting article to which our attention was drawn by Miss E. O. Cullen, Reference Librarian, Bureau of Railway Economics, Washington, D.C.

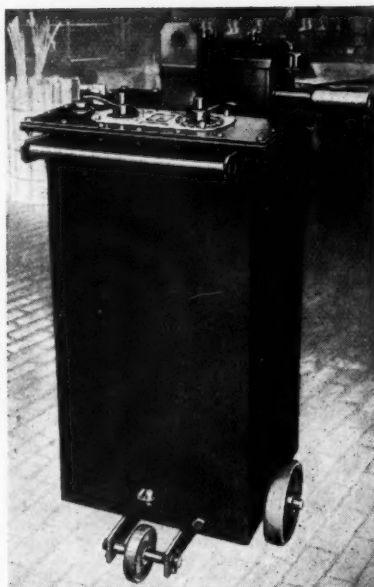
ARGENTINE ROAD CONSTRUCTION.—The Argentine Roads Board has approved plans for the construction of two important roads, in the province of Buenos Aires and the territory of Chubut, respectively, involving a total expenditure of nearly 4,000,000 pesos. The first-mentioned highway, which will be 26 km. long, will join Arroyo Burgos in Arrecifes, and will make possible direct communication between Arrecifes, Chacabuco, and Salto and the port of San Nicolás. The second plan provides for the construction of a road from Comodoro Rivadavia to the Aeroposta Airport, situated to the north of that town, and includes a bridge over the Cañadon valley.

Single-Operator A.C. Arc-Welding Sets

Details of a mobile unit designed by the Metropolitan-Vickers Electrical Co. Ltd.



The top cover, showing tapping switches and the link chamber



A Metrovick single operator a.c. welding set

SINGLE-OPERATOR a.c. arc-welding sets have been designed by Metropolitan-Vickers Electrical Co., Ltd. for use where welding work is small in quantity, varied or scattered over a considerable area. The single-operator sets are especially useful as auxiliary equipment in workshops or mechanical repair depots engaged in repairs to vehicles, rolling stock, and so on.

Three standard sets are available; they give maximum continuous hand-welding currents of 300, 450 and 600 A. respectively, at an open-circuit voltage of 100 V, with primary supply voltages between 380-440 V. single-phase at 50 cycles.

In general construction, the three sets are similar; each consists of an oil-immersed, single-phase, double-wound transformer, with a regulating reactor connected in series with the L.V. winding of the transformer. The transformer and reactor are built on a specially designed twin core and mounted in a weatherproof tank provided with rollers.

A two-pole switch fuse, provided on the primary side, isolates the entire unit from the supply, and an "off" position on one of the reactor switches permits the electrode holder to be isolated for renewing electrodes in complete safety.

The incoming supply is taken by three-core cable to the switch fuse; the third core is connected to a stud inside the switch fuse for earthing the tank and core.

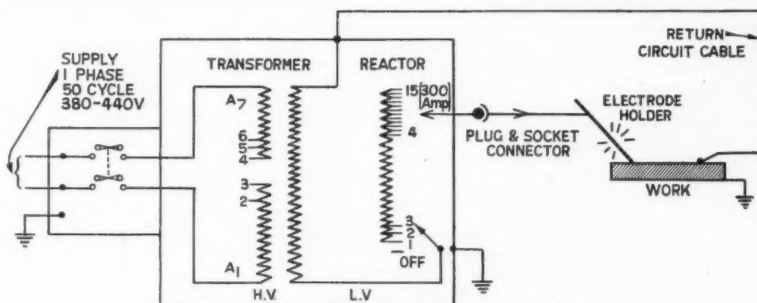


Diagram showing arrangement of connections

In addition, the tank may be earthed in the vicinity of the set, if so desired, by means of a cable taken to a lug welded to the tank body.

On the secondary side, a plug and socket outlet is provided for the welders' lead, and the earth-return cable is fastened to a lug welded to the tank cover; one end of the L.V. winding is bolted to the inside of the tank cover as seen in the accompanying diagram of connections.

To simplify lifting, single-point suspension is available, and, for pushing along the ground, handles are provided front and rear; the rollers are arranged to facilitate swivelling the unit in restricted spaces.

The transformer ratio is adjustable for 380-400-420-440/100 V. 50 cycles at no load, by means of links located inside the chamber on top of the cover. Tappings on the reactor, taken to the two switches mounted on the cover, enable the welding current to be varied over a wide range in a number of steps as indicated in the following table:—

Maximum continuous hand welding current (amps) ...	300	450	600
kVA rating of transformer to B.S.S. 171:1936 ...	18	27	36
Current range (approximately) (amps) ...	300-50	450-90	600-120
Number of steps ...	36	30	30

CAST COPPER ALLOYS.—A revision of the series of specifications for cast copper alloys has been issued by the British Standards Institution. A feature of the revision is the inclusion in the series of a further quality of cast alloy, which is a 83/3/9/5 leaded gunmetal; and the opportunity has been taken to incorporate some modifications to the other specifications. In view of this amplification of the series, a memorandum dealing with the conservation of tin in alloys has been prepared, and is now issued with the revised specification. Copies of the

new standard (B.S. 1021-8: 1942) are available from the Institution, 28, Victoria Street, S.W.1. price 2s.

SWEDISH ELECTRIFICATION POSTPONE-MENT.—The Swedish Minister of Transport declared recently, in reply to a question in the Riksdag, that he did not intend to ask for any allowances in the next budget for the complete electrification of the line between Stockholm and Hårnösand (the route is already electrically operated between Stockholm and Gävle). The Minister said that the cost of the electri-

fication had been calculated at kr. 58 million. He was of the same opinion as the Railway Board, that was to say, that the electrification of the line should be postponed until that of various other sections had been carried out, because the scheme would require heavy capital expenditure and the use of material in short supply. The Minister did not exclude, however, the possibility that the proposal would be taken up again when the general scheme for public works to counteract possible post-war unemployment was settled.

Light Electric Motorcoaches for Rack Railway

Bex-Chesières Railway introduces light-weight stock to accelerate the service

THE advantage of reducing the journey times, necessarily somewhat long at best, on the numerous mountain lines in Switzerland has been increasingly realised in recent years, and several railways, including the Pilatus and Vitznau-Rigi, with the introduction of electrification, have adopted modern forms of rolling stock which offer increased comfort and faster running with economy in power consumption. We are now able to give the following particulars taken from the *Bulletin Oerlikon*, of the new rolling stock running on the metre-gauge Bex-Chesières Railway, which starts from the Bex Station of the Swiss Federal Railways, between Territet and Martigny on the main Simplon route from Lausanne to Brigue. This is a mixed adhesion and rack line; the rack rail section is in one continuous portion towards the centre of the route. The three motorcoaches concerned were put into service in the first winter of the war and were designed by the Swiss Locomotive & Machine Works at Winterthur, which also constructed the mechanical parts; the electrical portion was made by the Oerlikon company's works. The new cars accomplish the run from Bex to Villars, a distance of 12.5 k.m. (7½ miles), in 45 minutes. Bex (S.F.R. station) is 1,350 ft. above sea level and the line runs thence through Bex village and the Avançon valley; the rack begins at Bévieux. In 3 miles a height of 3,720 ft. is attained at Gryon, after which adhesion working is used for the rest of the route. The last two stations, Villars and Chesières, are at 4,120 ft. and 3,995 ft. respectively. The steepest grade on the rack, which is of the double rail Abt pattern, is 1 in 5.

The line is worked on the 650 volts d.c. system with overhead conductor. The

coaches are divided into a smoking and non-smoking compartment, seating 43 persons (if 3 folding seats are used), and are one class only. There is a space for luggage and a driver's cab at each end. Entrance and exit are effected ordinarily through the folding doors of the driving compartments; the sliding doors of the luggage space serve as an emergency exit. The method of driving the adhesion wheels and rack rail pinions, which are always at the rear of each bogie as a coach ascends from Bex, was applied in principle by the Winterthur works as far back as 1904 on the Martigny-Châtelard line. The motor, which is of the Oerlikon "E 28" self-ventilated type of 125 h.p., drives through a friction coupling the pinion of the ordinary reduction gear, the spur wheel of which carries on its own shaft the band-brake pulley and drives through a cardan shaft a bevel pinion engaging with another, carrying on its own shaft two ordinary pinion wheels. One of the latter drives the spur wheel on the axle of the adhesion driving wheels, the other drives that attached to the two Abt wheels which engage with the rack, and which turn freely on the driving axle. The ratios of these gears are such that the peripheral speed of the pitch circles of the rack wheels corresponds with that of the treads of the bogie wheels for average tyre wear. The entire mechanism is contained in an oil- and dust-tight casing and has ball and roller bearings. Springs in the main wheel of the first reduction gear and in the Abt wheels ensure smooth action.

The two motors on a coach are permanently connected in series and controlled by cam-type controllers, with hand-wheel operation. Chromium-nickel strip resistances are mounted on the roof. There are two field-shunt steps, with 60 and 80 per

cent. excitation respectively; these are used to increase the speed on the adhesion sections. The chief features of the motors are:—

	Continuous rating	One-hr. rating
Output at shaft, h.p. ...	100	125
Current, amperes (at 650 v.) ...	250	314
Speed, m.p.h. ...	10	9.2
Tractive effort at wheel-tread, lb.	3,470	4,750

Current is collected by a single pantograph suitable for either aluminium or carbon strips; this is raised by spring power and lowered by pulling on a rope.

The increased speeds now being run on the rack railways necessitate complete and reliable braking equipment. The vehicles under review are fitted with five distinct means of braking, as follow:—(1) Rheostatic brake, used to control a descending coach on the rack section and, where suitable, on the adhesion sections. (2) Hand brake acting on the bogie band-brake drums. (3) Hand brake acting on the rack rail-pinion wheels. (4) Automatic-spring brake which acts on the band brake (2) and is brought into action when (a) descending speed on the rack exceeds 18 k.m. p.h. (11½ m.p.h.); (b) the dead man's pedal is released, (c) braking current fails. (5) Non-automatic compressed-air brake acting on the wheels and used only on the adhesion sections. A duplicate emergency air brake can be brought into action if the ordinary one fails. In addition, there is a special pawl brake acting with (3) above, preventing an ascending vehicle from moving backwards on the rack.

The principal dimensions and other features are:—

Dia. of bogie driving wheels ...	2 ft. 6½ in.
" " trailing wheels ...	1 ft. 11½ in.
Adhesion gear ratio ...	1 : 14.26
Rack gear ratio ...	1 : 10.81
Speed on 1 in 5 gradient ...	9.2 m.p.h.
Max. speed, adhesion ...	18.6 m.p.h.
" " rack section (lesser gradients) ...	11.1 m.p.h.
Max. allowable descending speeds—	
1 in 5 gradient ...	8.7 m.p.h.
1 in 6 gradient ...	9.3 m.p.h.
Weight of coach, empty ...	19 tons

Fluid Point-Heaters

An effective automatic device of London Transport to obviate snow difficulties

FOR a number of years, various means of melting snow in the vicinity of points on its railway system have been under consideration by the London Passenger Transport Board. The use of an electric heater in contact with the rail or chairs was not favoured, as it was felt that a heater mounted in such a position and exposed to vibration and weather conditions might soon develop defects, and any defect such as earth leakage might interfere with the proper operation of the track circuits. In such circumstances, apparatus which was intended to prevent delays might itself be the cause of delays.

Some electric heaters of the type which are laid on the ballast just below the rails have been installed, but the heating of the rails by this type of heater is by means of radiation and convection only, and the results obtained have not been altogether to the satisfaction of the London Transport Signal Engineer. As a result, a new type of heater was tried, in which hot liquid is circulated through pipes, and passes through hollow spaces formed by specially-cast slide chairs, and through a small tank bolted to the underside of the point lock. Hot oil is circulated by thermo-syphon action, and passes through the hollow chairs, so that heat is transmitted to the slide chair directly, and from the slide

chair, by direct contact, to the rail. Brief reference to the introduction of these heaters was made in our issue of January 28 last, page 98.

Thermometer readings taken on a set of points when the ambient temperature was 32° F. showed that, with the hot-oil circulation in operation, the temperature of the slide chairs at the tip of the points was 80° F., and the temperature of the coolest chairs, namely, those nearest the heel of the points, was 64° F. These temperatures should be adequate to melt very rapidly any snow which might otherwise accumulate on the slide chairs and prevent the points closing.

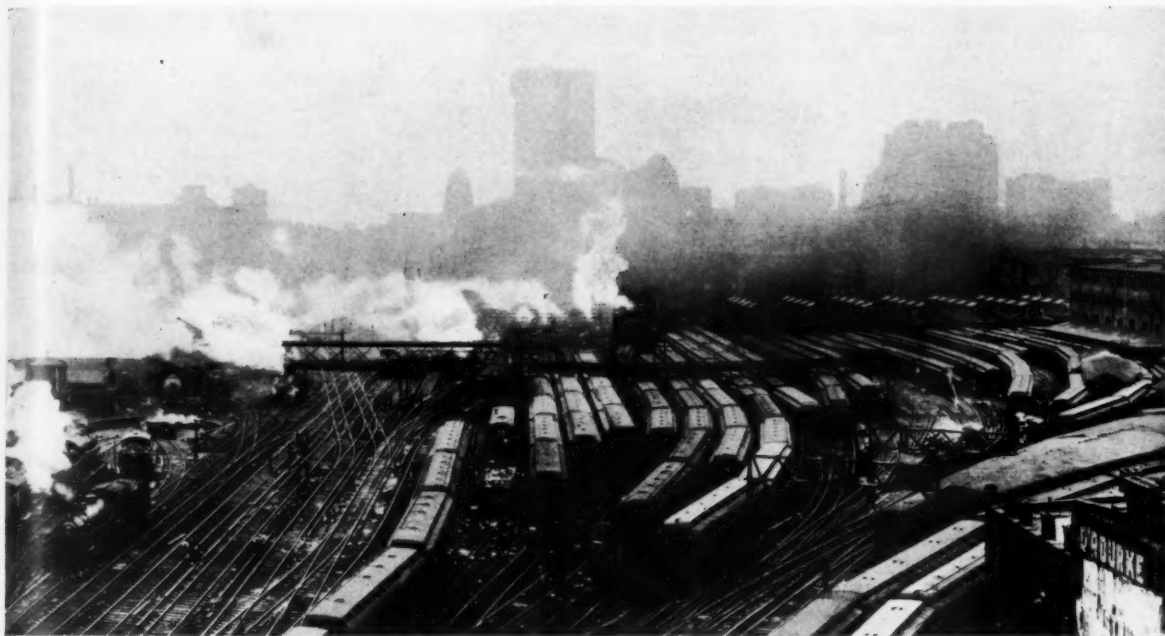
The oil is heated by electric elements in a "boiler," approximately 1 ft. cube. The boiler is located in a pre-cast concrete well, set below the ballast adjacent to the points. It must be set below the surface of the ballast in order that circulation of the oil by the thermo-syphon system can be effected.

The first experiments with immersion heaters set in the boiler were not successful, and accordingly the boilers have been fitted with heaters comprising open wire-wound radiator elements immersed directly in the oil. Thermostatic control of the temperature of the oil is provided by a thermostat fitted to the boiler. Con-

nections from the boiler to the points are by means of 1½ in. steel pipes with unions made of oilproof rubber hose for insulation, where necessary, to avoid interference with the track circuits. Similar rubber hoses are used for the connections between chairs, to avoid trouble from vibration. The pipes are installed in pre-cast concrete troughing, and the pipes and the boiler are insulated with sheet cork.

Current for the electric heaters in the boiler is taken from the current rail immediately in the vicinity of the points. An air temperature thermostat is provided to switch the current on to the boiler when the temperature falls below 35° F. Thus, the heaters are switched on only when they are actually required. The heater consumes approximately 4 kw. at 600 v. d.c. The temperature of the oil under working conditions is approximately 160° F., and even at this temperature no difficulty has been experienced with the oil-resisting rubber hoses, which so far have stood up to the work extremely well.

Originally schemes were prepared for the use of one boiler to supply several sets of points, and such an arrangement is, of course, practicable. By reason of the particular conditions under which the equipment was required to be installed on the London Transport railways, it was found more convenient to provide an individual boiler for every installation. So far, 40 sets of these point-heaters have been fixed in especially exposed parts of the railways, including depots where frozen points might easily delay trains going into service.

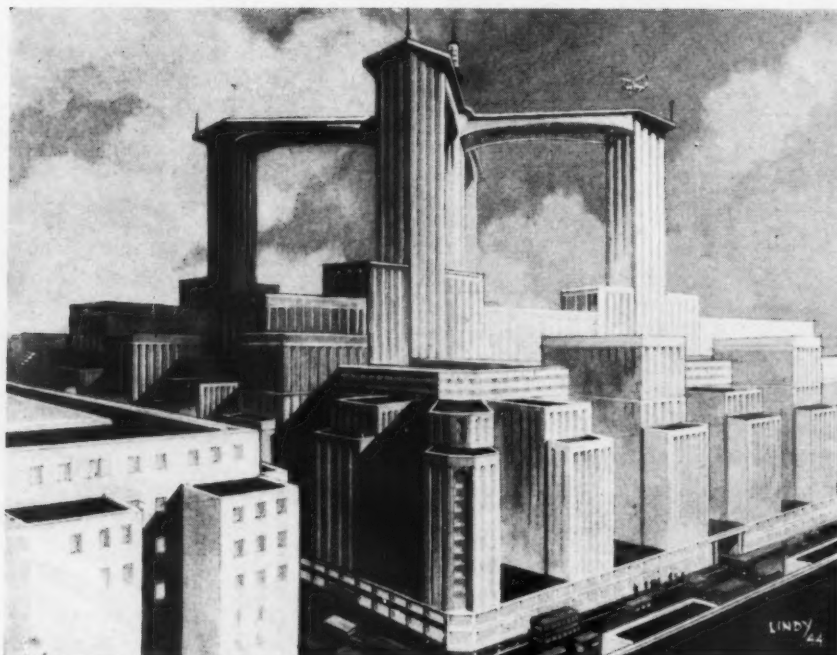


View of Grand Central Terminal, New York City, taken in 1906, before electrification



Corresponding view of Grand Central Terminal, New York City, taken in 1921, after the lines had been electrified and considerable use had been made of the resultant available building sites. The thoroughfare in the foreground is Park Avenue

(See editorial article, page 433)



A sketch exhibited by two architects (Kenneth Lindy and Winton Lewis) at the recent exhibition in London of the Incorporated Association of Architects & Surveyors, showing a suggested arrangement of the site of Liverpool Street Station, L.N.E.R., with the railway sunk beneath ground level; shops and offices constructed above; and gyroplanes arriving on special platforms overhead



View in the spacious main concourse of the Grand Central Terminal, New York. There are no waiting rooms or other buildings on the platforms, but everything for the passenger is concentrated. (See editorial, page 433)

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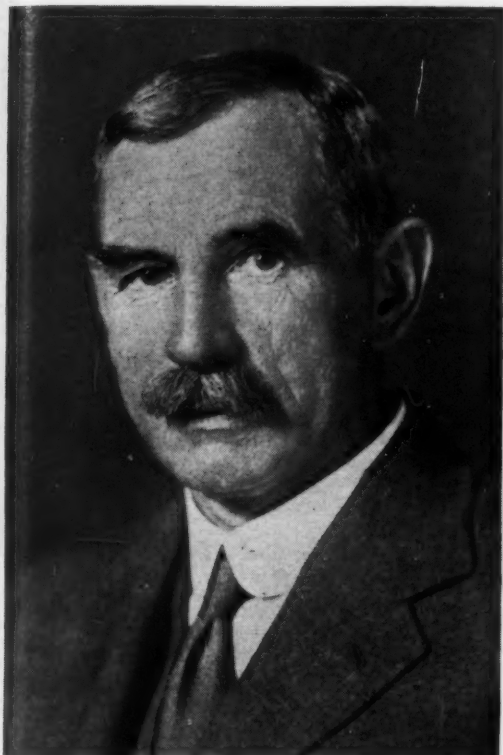
RAILWAY NEWS SECTION

PERSONAL

Sir Ernest Albert Seymour Bell, C.I.E., M.Inst.C.E., who has been Chairman & Managing Director of the South Indian Railway Co. Ltd. since 1935 and who has now been appointed a liquidator of the company in consequence of the termination of its working contract on March 31 last, received his engineering training at the Royal Indian Engineering College, Coopers Hill. In 1888 he was appointed by the Secretary of State as an Assistant Engineer in the Railway Branch of the

Bengal Railway, and in 1911 was transferred to the North Western Railway in a similar capacity. In the next year his services were lent to the Mysore Government for three years, during which period he carried out an extensive programme of railway surveys and construction. He became Agent of the Eastern Bengal Railway in 1915, and of the North Western Railway in 1919. A year later he was appointed a Member of the Railway Board and officiated as President for a short period in 1922. On leaving India in 1923 he became Government Director of Indian

Mr. Charles Alexander Muirhead, C.I.E., who has been a Director of the South Indian Railway Co. Ltd. since the end of 1940, and who has now been appointed a liquidator of the company in consequence of the termination of its working contract on March 31 last, is the son of the late Mr. Alexander Muirhead, C.I.E., at one time Agent of the same railway, and later Chairman & Managing Director. Mr. C. A. Muirhead was educated at Cheltenham College, and was appointed in London by the late Sir David Yule to Andrew Yule & Co. Ltd.,



Elliott

Sir Ernest Bell

[C. Fry

Chairman & Managing Director, South Indian Railway Co. Ltd., appointed a liquidator



Mr. C. A. Muirhead

A Director, and formerly Agent & General Manager, South Indian Railway Co. Ltd., appointed a liquidator

Indian Public Works Department. He had a year's practical training on the construction of the Forth Bridge, and in 1889 he proceeded to India and was posted to the East Coast Railway survey and subsequent construction. In 1894 his services were lent to the Assam-Bengal Railway, with which he served first as Personal Assistant to the Agent and Chief Engineer for two years, and then in charge of the first section of seven divisions between Chittagong and Silchar. In 1902 he became Assistant Secretary to the Public Works Department (Railway Branch). In 1905 he was transferred to the Nagda-Muttra Railway construction—now part of the B.B.C.I.R. main line—as Executive Engineer and Personal Assistant to the Engineer-in-Chief and officiated as Engineer-in-Chief for a short period when the permanent incumbent was on leave. Two years later he was appointed Deputy Manager of the Eastern

Railway Companies at the India Office, a post which he held until his retirement from Government service in 1926. He then was elected a Director of the South Indian Railway Co. Ltd., of which he became Chairman & Managing Director in 1935. Sir Ernest Bell is a Director of the Bengal-Nagpur Railway Co. Ltd., and is Chairman of the Barsi Light Railway Co. Ltd. He was made a Companion of the Order of the Indian Empire in 1919, and was knighted in 1923.

Mr. H. A. Short, M.C., Docks & Marine Manager, Southern Railway, has been elected Chairman of the Southampton Harbour Board.

Mr. J. E. Blackshaw, General Manager, Mr. R. Needham, General Sales Manager, and Mr. E. K. Pope, Secretary, G. D. Peters & Co. Ltd., have been appointed Directors of the company.

and went out to India in 1908. He joined the South Indian Railway in 1924, as Senior Assistant Secretary to the Agent, and in 1928 was promoted to be Secretary to the Agent. Mr. Muirhead acted as Deputy Agent from March, 1930, to June, 1931, when he was confirmed in that appointment. From March to October, 1933, he acted as Agent in the absence of Sir Percy Rothera on leave, and, when Sir Percy retired early in 1935, Mr. Muirhead succeeded him as Agent. The title of General Manager was added to that of Agent in 1939. He retired from the position of Agent & General Manager at the end of 1940, and was elected to a seat on the board of the company. He was President of the Indian Railway Conference Association in 1940-41. Mr. Muirhead was made a Companion of the Order of the Indian Empire in the New Year Honours List of 1941.

The Directorate of Prices & Statistics, Iron & Steel Control, Ministry of Supply, is now to be comprised of three separate departments under the direction of Mr. R. M. Shone, former Director of Prices & Statistics, who becomes General Director in charge of Prices, Costs & Statistics, with responsibility for co-ordination. The new departments are controlled by Messrs. C. F. Pagnamenta (Director of Prices), J. W. Erskine (Director of Costs), and S. T. Clark (Director of Statistics).

Mr. William Malcolm McGregor, O.B.E., who, as recorded in our April 21 issue, on re-transfer from the Oudh & Tirhut Railway, has resumed charge of his duties as Controller of Stores, North Western Railway (India), joined the former Eastern Bengal Railway as Assistant

Mr. H. Barnden, Registrar, Southern Railway Company, has retired from the company's service, and the directors have appointed Mr. S. L. Smart, as from April 1, to be Registrar.

Mr. J. L. Rowbotham has been elected a Director of Switchgear & Cowans Limited.

Mr. W. T. Branscombe and Mr. E. A. Dowler have been elected Directors of Pinchin, Johnson & Co. Ltd.

Mr. F. H. Grosvenor, who, as recorded in our last week's issue, is retiring from the position of Passenger Manager of the Peninsular & Oriental Steam Navigation Company, except for a brief period in the Correspondence Department when he

Chief of the Leicester to London Section of the Signal & Telegraph Engineer's Department, L.M.S.R.

The late Mr. William Hall Breach, formerly Traffic Manager, Aire & Calder Navigation, left £10,389.

Mr. E. A. Lees, A.M.Inst.C.E., who, as recorded in our issue of April 21, has retired from the position of District Engineer, Manchester, L.N.E.R., joined the former Manchester, Sheffield & Lincolnshire Railway at London Road Station, Manchester, in 1897. He was transferred to the District Engineer's Office in 1899, and in 1911 became Chief Draughtsman to the District Engineer, Guide Bridge, Manchester. In 1924 he



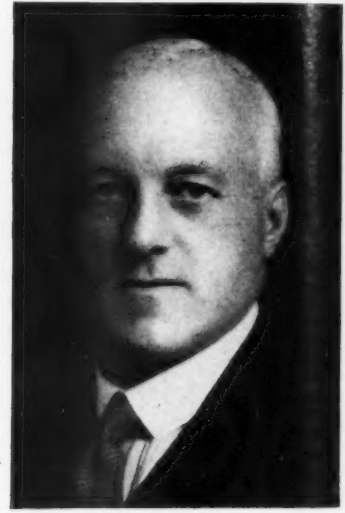
Mr. W. M. McGregor

Who, on re-transfer to N.W.R. (India), has resumed duty as Controller of Stores



Mr. F. H. Grosvenor

Passenger Manager, P. & O. Steam Navigation Company, 1916-44



Mr. E. A. Lees

District Engineer, Manchester, L.N.E.R., 1929-44

Storekeeper in 1908. He was appointed District Controller of Stores in 1918, and went to the East Indian Railway in a similar capacity in 1927. He returned to the Eastern Bengal Railway in 1931, and a year later was appointed Controller of Stores, which position he held until 1941, when he was transferred to the corresponding post on the North Western Railway. Last year he proceeded on deputation to the Oudh & Tirhut Railway, from which he returned recently to resume charge of his duties on the N.W.R. Mr. McGregor was made an Officer of the Order of the British Empire in the New Year Honours.

L.M.S.R. APPOINTMENTS

The L.M.S.R. announces the following appointments:—

Mr. G. E. Staves, Head of Section (Docks & Canals), Chief Commercial Manager's Office, Watford, H.Q., to be Assistant (Docks & Canals), Chief Commercial Manager's Office, Watford, H.Q.

Mr. H. Bullough, Chief Clerk (Personal Section), Chief Commercial Manager's Office, Watford, H.Q., to be Assistant (Research), Chief Commercial Manager's Office, Watford, H.Q., vice Mr. G. F. C. Frost, promoted.

Mr. A. Jessop, Head of Section (Road & Air Transport), Chief Commercial Manager's Office, Watford, H.Q., to be Assistant (Outdoor), Chief Commercial Manager's Office, Watford, H.Q.

joined the company 52 years ago, has spent the whole of his career in the Passenger Department. He became head of that department in 1916. Mr. Grosvenor is one of the best known and most popular of shipping passenger managers.

Mr. C. E. Parnall has been appointed Advertising Manager of C.A.V. Limited, in succession to the late Mr. Cecil Broadhurst.

It is announced in the Fourth Supplement to *The London Gazette* of April 11 that the King has awarded the Imperial Service Medal to 20 employees of the New South Wales Department of Railways and one employee of the Department of Road Transport & Tramways in the same State.

Mr. E. R. Battley, Chief of Motive Power & Car Equipment, Canadian National Railways, has been appointed a member of the Technical Committee on Locomotives (Railroad Division), American Society of Mechanical Engineers, New York.

The Honorary Freedom of the Borough of Bedford has been conferred on Alderman W. E. Sowter, M.B.E., J.P., who, at the time of his retirement in 1930, after over 46 years' railway service, was

was made Assistant to the District Engineer, and in 1929 took over the position from which he has retired.

Mr. A. J. Boyd, Managing Director of the Metropolitan-Cammell Carriage & Wagon Co. Ltd., has been elected a Director of Associated Electrical Industries Limited.

INDIAN RAILWAY STAFF CHANGES

Mr. A. C. Chatterjee has been appointed to officiate as Deputy Chief Engineer, B.A.R.

Mr. J. D. B. Osborn has been appointed to officiate as Deputy Chief Transportation Manager, B.A.R.

Mr. J. S. Mathur has been appointed to officiate as Divisional Superintendent, B.A.R.

Mr. G. C. K. Jolley has been appointed to officiate as Deputy General Manager (War Planning), B.B.C.I.R.

Mr. O. Gomes has been appointed to officiate as Deputy Chief Traffic Manager (Claims), B.B.C.I.R.

Dr. R. A. Heatley has been appointed to officiate as Chief Medical Officer, B.B.C.I.R.

Mr. H. Gatford has been appointed to officiate as Deputy General Manager, E.I.R.

Mr. F. P. Vandertaalen has been appointed to officiate as Deputy General Manager (Staff), G.I.P.R.

TRANSPORT SERVICES AND THE WAR—239

G.W.R. Special Trains

No fewer than 65,000 special trains for Government personnel and stores have been run by the G.W.R. since war began.

Withdrawal of Nunhead-Crystal Palace Trains

The Southern Railway has announced that the passenger service on the Nunhead to Crystal Palace (High Level) line will be withdrawn on Monday, May 22. The stations affected will be Honor Oak, Lordship Lane, Upper Sydenham, and Crystal Palace (High Level). The closure is due solely to the manpower position.

Army Transport in London

Disaffection with the summer schedules caused a sudden unofficial strike on Saturday, April 15, by more than 2,000 trolleybus drivers and conductors, mainly in the East End and the dock areas, affecting 15 routes. On the Sunday, the Transport & General Workers Union advised the staffs to return to work on Monday, which they did. There were no stoppages on Monday or Tuesday. On Wednesday (April 19) the staffs of two trolleybus depots and two bus garages came out, but there was little sign of the stoppage being either lengthy or extensive, and the T. & G.W.U. made another call to its members to return to work and allow the union to negotiate. On April 20, however, the strike spread, and the disorganisation to essential London traffic resulted in Army intervention. On that morning 90 Army lorries manned by R.A.S.C. drivers assisted in conveying early business crowds to work; 50 were on bus routes and 40 on trolleybus routes. There were no conductors, and no fares were taken. In addition, about 180 R.A.S.C. men manned buses on the services operating from Mortlake Garage; some of them acted as conductors but took no fares. Accompanying illustrations show an Army lorry-bus and Army crew on an ordinary bus. On the Friday, the Army lorries were confined to sections of trolleybus routes (as the soldiers were not trained to drive trolleybuses), and there were Army crews on a number of buses. The strike collapsed on Saturday,

and normal services were run by the regular busmen on Sunday, April 23.

Military Control of Roads

A new Regulation was made on April 18 dealing with the control of roads in Great Britain, to facilitate military movements. The text is as follows:—

"Subject to any directions which may be given by a Regional Commissioner, a chief officer of police—or an officer of police of a rank not lower than that of inspector and authorised by a chief officer of police to act under this Regulation—may give such directions for controlling the use of roads as they appear to him requisite for the purpose of securing in connection with military movements the free passage of military and other essential traffic or of dealing with abnormal road traffic conditions due directly or indirectly to such movements or to attack by the enemy. Any constable, and any member of H.M. Forces in uniform and acting in the course of his duty as such, may take such steps and use such force as may appear to him to be reasonably necessary to secure that the directions are or will be complied with."

Race Traffic

For Newmarket Races, on April 18, there was only the ordinary morning train from Liverpool Street Station at 8.20 a.m. When this train was full, the L.N.E.R. closed the booking office and issued no more tickets until after it had departed.

In connection with the Downpatrick Races, which were held on April 19, the Belfast & County Down Railway issued a special notice to the effect that the company was not permitted to run any additional trains for the event. Ordinary trains leave Belfast at 7.40 a.m. and 10.50 a.m., and arrangements were made to issue tickets in advance at Belfast Station booking office on April 18, from noon, to the extent of the accommodation available by those trains. Not more than two tickets were supplied to any one person, and passengers were required to travel by the train for which the ticket was available. The issue of tickets to

Downpatrick from Bloomfield, Neill's Hill, Knock, and Dundonald stations in connection with those trains was suspended on April 19.

The England-Portugal Air Line

With the arrival on April 18 of a Douglas aircraft at a West of England airport, the K.L.M. (Royal Dutch Air Lines) completed 1,000 return flights between England and Portugal since July, 1940.

Fewer Ships to and from Ireland

By reason of the reduction in passenger traffic between Great Britain and Ireland, in consequence of special temporary restrictions, the passenger shipping services between the two countries were reduced drastically on Monday last, April 24. Concurrently, there was a revision of merchandise and livestock ship sailings. The cancellation of all cross-channel shipping services from Cork was announced on April 18 by the British & Irish Steam Packet Co. Ltd. and the Clyde Shipping Co. Ltd.; it is hoped, however, to maintain a skeleton service between Dublin and Great Britain.

The Railway Cuts in Eire

Further details are now available concerning the drastic curtailments in the train services of the Great Southern Railways Company which became effective on Monday last, April 24. In general, passenger trains have been reduced to two days a week (Monday and Thursday), excepting on suburban lines, where morning and evening business trains continue to be operated daily. The issue of tickets to passengers for main-line trains is limited. Dining cars have been withdrawn. Except on suburban sections, the issue of return tickets has been withdrawn. All through fares between Great Southern stations and stations on the lines of other companies in Ireland and Great Britain has been suspended. Goods train services have been reduced to four days a week (Monday, Tuesday, Thursday, and Friday), but daily services continue to be operated for milk and certain other perishable traffics, as heretofore. Restrictions have been introduced on the acceptance of goods traffic which is being regulated from time to time in accordance with priorities as directed



Left: Army lorry with soldier driver maintaining service over a portion of a Central London trolleybus route. Right: Men of the Royal Army Service Corps acting as driver and conductor of a London bus during the strike. No fares were collected on vehicles operated by the military

by the Minister for Industry & Commerce. The following branch lines have been closed to all traffic:—

Bagenalstown—Palace East
Maryborough—Mountmellick
Birdhill—Kilalee
Goulds Cross—Cashel
Fermoy—Mitchelstown
Banteer—Newmarket
Tralee—Fenit
Crossdoney—Killeshandra
Woodenbridge—Shillelagh
Schull—Skibbereen
Clara—Streamstown

In the list originally published, the branch from Kilfree Junction to Ballaghadereen was also included, but it has not appeared in subsequent lists.

Substitute road merchandise services were introduced on April 24, covering the branches where all train services are cancelled, but in many cases operating through to a more convenient point than the rail junction of the branch.

In addition, passenger services have been withdrawn on the following lines:—

Dublin—Tullow
Dublin—Kingscourt
Mullingar—Cavan
Waterford—Macinnee, via New Ross

These restrictions are stated to be due to the coal shortage resulting from the British ban on coal exports.

Because of transport difficulties, the Central Advisory Racing Committee decided on April 14 to confine racing to such places as the Curragh, where horses are trained, as no transport will be provided for racing purposes.

These severe curtailments do not apply to the Great Northern Railway, running between Northern Ireland and Dublin.

Local Traffic in Dublin

In view of the fuel shortage, there has been a considerable increase in horse transport in Dublin, and many antiquated horse-drawn vehicles have emerged from a retirement of 40 years.

Rolling Stock Production in Japan

In accordance with a decision taken by the Japanese Cabinet last July, the building of railway rolling stock has now been placed under the direct control of the recently-established Ministry of Transport. Extensive standardisation has been effected, mainly in privately-owned locomotive and wagon works, to accelerate production; also the railway industry has been given the status of a key industry. A measure to secure close collaboration with the Ministry of Industries is that certain officials are to act for both the Ministry of Transport and the Ministry of Industries on those matters concerning the output of rolling stock.

A German View of French Dispatching

The circumstances of the present war have brought the French train dispatching (or traffic control) systems under German control, and a critical study of them has appeared in the German technical press, presenting comparisons between French and German methods. An important conclusion is that traffic irregularities are better handled in France, and that the extra dispatching staff could be obtained in Germany by following the French policy of installing automatic in place of manual signalling. It may be recalled that, during the 1914-1919 war, the American Army transport authorities introduced on the French railways (chiefly at first on certain routes of the Orleans system), the selective telephone system of traffic control, or dispatching, to regulate the flow of trains to and from their principal distributing centre of Is-sur-Tille. The success attending this led the Orleans Railway to extend the system considerably after peace was

declared, and the example was followed by other French lines, on the Belgian State Railways, and elsewhere. Before the last war began, some continental administrations had contemplated adopting something of the kind, even in Germany, where the individual authority of stationmasters had always been very great and anything in the nature of dispatching was not viewed with favour. The subject had formed one specially discussed at the 10th International Railway Congress in London in 1910. Little had been done, however, and after the war the improvements made in the available equipment were found to have rendered some of the earlier proposals obsolete.

A Win for U.S.A. Strikers

The strike of employees on the Toledo, Peoria & Western Railroad that resulted in that system being taken over and operated by the United States Government, which is still in possession, has been recalled by a decision of the U.S. Supreme Court in the case of the Brotherhood of Railroad Trainmen *versus* the Toledo, Peoria & Western. This decision lays it down that, before a Federal Court can prohibit striking railway employees from interfering with interstate commerce by violence or threats of violence, it must be shown that the railway must first have made every reasonable effort to settle the dispute under the provisions of the Railway Labour Act, and that such efforts had not been made by the T.P. & W. management in this case.

Tackling an American Troop Train Emergency

On August 25 last, a remarkable emergency repair was effected on the Erie Railroad main line at Marion, Ohio, in order to cut to a minimum the delay to a troop train caused by a defective wagon. At 2.35 p.m. this train, carrying troops and 25 flat wagons loaded with their equipment, stopped on the westbound main track at Marion, which is a divisional point on the Erie, to change engines and for the usual routine inspection, servicing, and supplies. Two car inspectors, together with an observant conductor working with a neighbouring shunting locomotive, discovered that on the 19th wagon from the rear end one of the wheels had a fracture 5½ in. long and 1½ in. deep, inclined inwardly, and it was obvious that the wagon could not be permitted to continue to run in this condition. On an adjacent track was the conductor's shunting locomotive, which had been assigned to a special duty, and in view of the importance of not delaying the troops or depriving them of any part of their equipment, this crew, in conjunction with the servicing and inspection squad, decided to take immediate action. The shunting engine was backed until it could switch to the westbound main track, and reach the back of the troop train, a total distance of about a mile. The rear 19 wagons were then detached and moved to No. 3 repair track, where a repair gang, which had been notified to be in readiness, was waiting with power jacks and all necessary tools. After the engine had spotted the defective vehicle at the right point, and had pulled the remaining 18 wagons away, to permit the necessary warning flags to be placed on the line on both sides of it, a beginning was made at 3 p.m. with jacking up the wagon-end above the defective bogie. With the aid of a special device used at this and other Erie depots for dismantling bogies, the affected pair of wheels was withdrawn, a new pair substituted, the wagon lowered again on to the bogie, and the entire repair completed by 3.18 p.m., that is, in 18 min.

overall. Four minutes later the 19 wagons had been switched back on to the train, and by 3.29 p.m., after the necessary air-brake tests had been made, it was on its way, 54 min. after arrival at Marion. As in any event the engine change, servicing, and inspection of the train would have taken 20 min., the net delay caused by the replacement of a pair of wheels was only half-an-hour, or very little over, and the promptitude with which the emergency was tackled reflected great credit on all concerned.

Limiting American Ticket Commissions

To control abuses in the sale of railway tickets and in seat and berth reservation in trains, New York City has made it a misdemeanour for any individual or business concern to make a service charge of more than \$1 for supplying tickets or accommodation on trains, buses, or aeroplanes. Violators of this law, which has been enacted by the City Council, will be punished with a fine of \$100, imprisonment for 10 days, or both. In recent months intermediaries have been buying blocks of railway tickets and space reservations on popular trains, which, in present conditions of overcrowding, they have been able to sell at a considerable profit.

American Accidents in Wartime

The considerable increase that has taken place during the war years in the number and severity of American railway accidents has resulted in a demand for complete investigation by a select committee of the House of Representatives, tabled by Representative Capazzoli, Democrat of New York State. The committee would consist of five members of the House, designated by the Speaker, and the scope of the inquiry would be the accidents which have occurred during 1942 and 1943. The proposed terms of reference include the construction and maintenance of locomotives, coaches, wagons, tracks, and all equipment and facilities; management and operation; administration of laws and regulations relating to the railways and the inspection of tracks and safety equipment; and the advisability of establishing priorities for travellers in wartime. An editorial article on American accidents appeared in our January 14 issue.

The American Steel Rail Situation

The derailment and collision of two sections of the Tamiami Champion of the Atlantic Coast Line on December 16 last, due to a broken rail, has given another warning in the United States of the seriousness of the rail problem. As a result of restrictive action by the War Production Board during 1943, due to shortage of materials, only 1,485,000 tons of rail were delivered to the railways, whereas they had drawn up relaying programmes calling for 2,100,000 tons. In the previous year (1942), the total rail deliveries were 2,069,159 tons, the first time the 2,000,000-ton limit was passed since 1930, although still far less than the rail production in 1925, 1926, 1927, and 1929, in all of which years 3,000,000 tons was exceeded, with a peak of 3,603,767 tons in 1926. In the depression years of 1932 and 1933, however, orders fell as low as 450,874 and 466,252 tons, and as a result of severely restricted relaying in those and succeeding years, the unprecedented wartime increase in rail traffic has found the railways with arrears of track maintenance not yet overtaken. It is hoped that the railways may be able to obtain at least 2,000,000 tons of new rail in 1944, and in view of the easier manufacturing situation the War Production Board has agreed to 1,875,000 tons out of the railways' 2,600,000-ton programme.

The Railway Position in East Prussia

Whatever territorial changes may be made at the conclusion of the present war it seems certain that some of them will appreciably affect the position of the German province of East Prussia, which became separated after the last war from the rest of the German Empire of 1871. The creation of the so-called Polish Corridor led to considerable changes in railway working in the areas affected, both from the German and Polish points of view, and lines which for many years had been through main routes on one nation's territory were found passing across a stretch of foreign land.

Certain sections of line lost their importance, and some even became useless; on others, however, the traffic increased. Before the last war there were Prussian Divisional Managements at Danzig, Posen, and Bromberg (Bydgoszcz), but the greater part of the lines they controlled passed into the hands of the Polish State Railways and it became necessary to re-arrange the lines on the German side of the western frontier of the new Polish State. Some were given to existing divisions and others placed under a new divisional management called Osten (East), centred eventually on Frankfurt-on-Oder.

In East Prussia itself, the lines were formed into a separate division and managed from Königsberg, where a divisional management was first established in 1895 to work sections previously directed from Bromberg. More than 200 miles of route formerly controlled from Danzig passed to Königsberg, and about 90 miles were transferred to the Lithuanian State Railways, which took over the Memel territory. Many routes were cut off short at frontier points.

Traffic across Polish territory was regu-

lated by the provisions of the Treaty of Versailles—modified in course of time by agreements between Poland and Germany—which, among other things, established the "privileged" trains, free from customs and other formalities. The effects on commerce of the new frontier arrangements were most marked, and the establishment of the three Baltic States of Lithuania, Estonia, and Latvia, had noticeable repercussions on the economic conditions in East Prussia, which formerly had only one foreign country adjacent to it, namely, Russia. The establishment of Danzig as a Free City also affected the picture. Broadly, the total railway traffic declined by about one third, although an improvement set in from about 1934. Train mileage is stated to have risen by some 40 per cent. by 1938, and the total of passengers carried by rather more.

Germany marched into the Memel territory in March, 1939, and the main-line railways were incorporated in the Reichsbahn. There were also some light railways, of about equal mileage, managed by a German company, all but one of metre gauge. In earlier times they all served principally local interests, but some extensions into then Russian territory in the 1914 war somewhat increased their importance.

With the entry of Germany into Poland and the subsequent establishment of the so-called German-Russian "frontier of interests," a great change came over the railway situation in East Prussia. At first, of course, the Poles destroyed or damaged large numbers of bridges, tunnels, etc., on their own lines, but the Germans made special efforts to restore communications, apparently with fair success. Danzig was made a Divisional Management, as it had been in old Prussian days, and took over the working of the lines thence to Gdynia, Dirschau, and other places, together with the route from Eylau

to Thorn and others in association with it. Altogether Königsberg parted with some 325 km. (202 miles) of route to the Danzig management, but took over, inclusive of the Puppen light railway, bought from a company, about 300 km. (186 miles) in the occupied Suwalki territory.

At the time of the invasion of the Soviet Union by Germany in 1941, the Bialystok district of Poland was brought under the civil administration of East Prussia, with the railways, totalling 1,209 km. (751 miles), of which 151 km. (94 miles) were narrow gauge. The position of this area, in size about equal to Belgium, between East Prussia and the Ukraine, with the German "General Gouvernement" of occupied Poland and the "Eastern Territory" adjoining, make the railway routes of very great importance to Germany's military effort. The principal ones run from Königsberg, in East Prussia itself, through Bialystok and Brest-Litovsk, to Kovel and Kiev; and from Warsaw, through Bialystok to Vilna and Leningrad. From Königsberg to Bialystok is 250 km. (155 miles) in a direct line.

The importance of the territory to the Germans is seen from the fact that about 66 per cent. of it is occupied with agriculture, and 23 per cent is wooded. Cattle are not abundant, however, and great losses among them have resulted during the fighting. Textiles and leather are produced, but the timber industry is the most valuable to Germany at present.

The result of bringing the railways into the Königsberg division of the Reichsbahn has been to increase the route mileage worked from 3,239 km. (2,013 miles) in 1938 to 4,540 km. (2,821 miles) in 1943, an increase of just over 40 per cent., making Königsberg the largest Divisional Management of the Reichsbahn as regards standard-gauge lines, and second in total length only to Dresden, which possesses an exceptional mileage of narrow-gauge lines. With the increasing threat to Germany's position, both in the north and in the east, the task thrown on the East Prussian and associated lines has grown, and the traffic handled is stated to have attained to an unprecedented volume.

Staff and Labour Matters

Railway Wages

Further meetings in connection with the trade union applications for increases in the war advance payable to railway staff, and in the annual holidays of railway conciliation staff were held in London on April 17 and April 20, between representatives of the Railway Executive Committee and the National Union of Railwaymen, the Associated Society of Locomotive Engineers & Firemen, and the Railway Clerks Association. Agreement was reached on April 20 under which the war advance is increased as from April 17 as follows:—

Conciliation staff—	Increase	Total war advance
Adult males ...	5s. weekly	25s. 6d. weekly
Junior males ...	2s. 6d. weekly	12s. 9d. weekly
Adult females ...	5s. weekly	21s. 6d. weekly
Junior females ...	2s. 6d. weekly	10s. 9d. weekly
Salaried staff—		
Adult males ...	£13 yearly	£66 6s. yearly
Junior males ...	£6 10s. yearly	£33 3s. yearly
Adult females ...	5s. weekly	21s. 6d. weekly
Junior females ...	2s. 6d. weekly	10s. 9d. weekly

The increases will be taken into consideration in calculating overtime, Sunday duty, and night duty payments, also aggregation allowances, but not in connection with superannuation.



Sketch map of the railways of East Prussia before the territorial adjustments around Memel made in March, 1939

British Railway Shareholdings in Road Transport

We set out in the table below the railway shareholdings in the principal passenger road transport undertakings operating in the provinces. It will be seen that investments are profitable in securing a high return. The total sums invested in associated bus companies, as shown in the annual reports for the year ended December 31, 1943, are as follows:—

L.M.S.R.	£ 2,868,180
L.N.E.R.	2,348,532
G.W.R.	2,300,133
S.R.	2,105,675
Total	9,622,520

These amounts do not agree with the totals of holdings shown in the accompanying table, as the former represent the cost of the investments, whereas the table shows the nominal holdings. As the Southern Railway Company's investments in passenger road transport undertakings are not charged to capital expenditure, the details are not given in the accounts, but we are enabled to include the figures by courtesy of Mr. R. G. Davidson, the Chief Accountant of the company.

In our issue of June 11, 1943, page 580A, we included a folding plate giving details of the organisation of the bus companies in the British Electric Traction Co. Ltd. and the Thomas Tilling Limited

groups at January 1, 1943. The figures then given are unchanged with the exception of the L.N.E.R. and L.M.S.R. holdings in the Lincolnshire Road Car Co. Ltd., which have been increased by £15,002 and £4,000 respectively.

Goods transport by road is not susceptible of such easy definition, for the railways use their own parcels vehicles, and also have large investments in some important firms of goods hauliers. The four main-line companies have invested £3,183,564 in Hay's Wharf Cartage Co.

Ltd. (of which Pickfords Limited is a subsidiary). Up to 1943, the railways had £1,342,996 invested in Carter Paterson & Co. Ltd. As a result of the Pickfords and Carter Paterson merger for operational purposes, details of which appeared in our issue of July 23, 1943, page 78, the amount now invested in Hay's Wharf represents the sum of the investments previously held in this company and in Carter Paterson.

The L.N.E.R. holds £84,808 in Currie & Co. (Newcastle) Ltd. and £17,000 in J. W. Petrie Limited; and the L.M.S.R. £142,939 in Wordie & Co. Ltd., and £135,049 in Joseph Nall & Co. Ltd.

C.P.R. AUTOMATIC BLOCK SIGNALLING.

—The automatic block signal system installed between Chapeau and Schreiber, Ontario, to expedite traffic in the Algoma District of the Canadian Pacific Railway, has been placed in operation. The section concerned is of single line and is about 250 miles in length. As recorded in our August 13, 1943, issue (in which some details of the equipment, as then proposed, were given), the contract for the section between Chapeau and White River (about 130 miles) was placed with the Union Switch & Signal Company, and that for the White River-Schreiber line (about 120 miles) with the General Railway Signal Company. Part of the equipment was

supplied by the C.P.R. Angus Shops. The total cost was about \$1,100,000.

CHILEAN TRAMWAY NATIONALISATION.—According to recent reports from Chile, U.S.A., financial circles have agreed to grant the Chilean Government a credit of \$3,000,000 to be used for the nationalisation of the tram systems of Santiago, Valparaiso, and San Bernardo now controlled by U.S.A. interests. The granting of the credit contains the proviso of an increase in fares, since the receipts of these undertakings do not cover expenditure. The Santiago trams were placed under State supervision about a year ago to prevent an increase in fares.

RAILWAY SHAREHOLDINGS IN PASSENGER ROAD TRANSPORT AT DECEMBER 31, 1943, SHOWING EARNINGS FOR THE PAST YEAR

Associated company	Issued share capital	L.N.E.R.		L.M.S.R.		G.W.R.		S.R.	
		Holding	Earnings†	Holding	Earnings†	Holding	Earnings†	Holding	Earnings†
Aldershot & District Traction Co. Ltd. ...	250,000 Ord. ...	£	£	£	£	£	£	£	£
W. Alexander & Sons Ltd.* ...	825,000 Ord. ...	112,500	35,000	{ 112,500 }	35,000	—	—	82,721	8,272
...	250,000 6% Par. Pref. ...	125,000	—	{ 125,000 }	—	—	—	—	—
Birmingham & Midland Motor Omnibus Co. Ltd. ...	1,440,000 Ord. ...	—	—	432,000	64,800	288,000	43,200	—	—
City of Oxford Motor Services Limited ...	100,000 8% Cum. Pref. ...	—	—	—	—	113,000	13,560	—	—
...	226,000 Ord. ...	—	—	—	—	—	—	—	—
Crosby Motor Services Limited ...	74,000 6½% Cum. Pref. ...	—	—	—	—	—	—	—	—
Cumberland Motor Services Limited ...	1,100,000 Ord. ...	—	—	412,071	30,219	137,357	10,073	—	—
Devon General Omnibus & Touring Co. Ltd. ...	150,000 Ord. ...	—	—	49,999	9,000	—	—	—	—
...	200,000 Ord. ...	—	—	—	—	40,917	6,137	27,279	4,092
Eastern Counties Omnibus Co. Ltd. ...	150,000 7% Cum. Pref. ...	—	—	—	—	—	—	—	—
...	756,000 Ord. ...	184,089	22,091	25,282	3,034	—	—	—	—
...	200,000 5% Cum. Red. Pref. ...	—	—	—	—	—	—	—	—
Eastern National Omnibus Co. Ltd. ...	900,000 Ord. ...	225,000	24,750	225,000	24,750	—	—	—	—
East Kent Road Car Co. Ltd. ...	450,000 Ord. ...	—	—	—	—	—	—	151,355	12,108
...	200,000 6½% Cum. Pref. ...	—	—	—	—	—	—	—	—
East Midlands Motor Services Limited ...	250,000 Ord. ...	83,333	11,666	41,667	5,833	—	—	—	—
East Yorkshire Motor Services Limited ...	300,000 Ord. ...	149,362	22,404	—	—	—	—	—	—
Hants & Dorset Motor Services Limited ...	550,000 Ord. ...	—	—	—	—	—	—	213,556	38,440
...	150,000 6½% Cum. Pref. ...	—	—	—	—	—	—	—	—
Hebble Motor Services Limited ...	120,000 Ord. ...	15,000	2,250	45,000	6,750	—	—	—	—
Highland Transport Co. Ltd.† ...	35,000 Ord. ...	—	—	14,875	1,093	—	—	—	—
Lincolnshire Road Car Co. Ltd. ...	200,000 Ord. ...	79,931	7,209	19,985	1,803	—	—	—	—
Maldstone & District Motor Services Limited ...	750,000 Ord. ...	—	—	—	—	—	—	263,492	29,643
...	200,000 6½% Cum. Pref. ...	—	—	—	—	—	—	—	—
Northern General Transport Co. Ltd. ...	831,081 Ord. ...	365,767	36,577	—	—	—	—	—	—
...	300,000 6½% Cum. Pref. ...	—	—	—	—	—	—	—	—
North Western Road Car Co. Ltd. ...	750,000 Ord. ...	124,444	22,400	248,888	44,800	—	—	—	—
Ribble Motor Services Limited ...	1,005,979 Ord. Stock ...	—	—	530,445	53,044	—	—	—	—
...	1,200,000 Ord. ...	—	—	—	—	—	—	—	—
Scottish Motor Traction Co. Ltd. ...	200,000 6½% Cum. Pref. ...	251,495	66,532	251,494	66,532	—	—	—	—
...	1,000,000 6½% Cum. Pref. ...	—	—	—	—	—	—	—	—
Southdown Motor Services Limited ...	750,000 Ord. ...	—	—	—	—	—	—	242,792	24,279
Southern National Omnibus Co. Ltd. ...	542,200 Ord. ...	—	—	—	—	—	—	271,100	18,977
Southern Vectis Omnibus Co. Ltd. ...	115,000 Ord. ...	—	—	—	—	—	—	57,500	9,200
...	15,200 6% Cum. Pref. ...	—	—	—	—	—	—	15,000	900
Thames Valley Traction Co. Ltd. ...	250,000 Ord. ...	—	—	—	—	85,191	13,630	36,510	5,842
Trent Motor Traction Co. Ltd. ...	540,288 Ord. ...	75,147	7,515	150,293	15,029	—	—	—	—
United Automobile Service Limited ...	1,627,233 Ord. ...	798,412	146,488	—	—	—	—	—	—
...	150,000 7% Cum. Pref. ...	39,622	—	—	—	—	—	—	—
Western National Omnibus Co. Ltd. ...	2,000,000 Ord. ...	—	—	—	—	1,000,000	114,000	—	—
...	400,000 6% Cum. Pref. ...	—	—	—	—	400,000	—	—	—
Western Welsh Omnibus Co. Ltd. ...	507,500 Ord. ...	—	—	—	—	253,750	30,450	—	—
West Yorkshire Road Car Co. Ltd. ...	787,500 Ord. ...	195,843	39,169	195,843	39,169	—	—	—	—
...	200,000 6½% Cum. Pref. ...	—	—	—	—	—	—	—	—
Wilts & Dorset Motor Services Limited ...	120,000 Ord. ...	—	—	—	—	—	—	30,724	6,145
Yorkshire Traction Co. Ltd. ...	437,500 Ord. ...	107,289	17,491	107,289	17,493	—	—	—	—
...	24,350 7% Non Cum. Pref. ...	4,661	—	4,662	—	—	—	—	—
Yorkshire Woollen District Transport Co. Ltd. ...	528,000 Ord. ...	88,000	14,080	176,000	28,160	—	—	—	—
Totals	3,024,895	475,622	3,168,293	446,509	2,318,215	231,050	1,392,029	157,898

* W. Alexander & Sons Ltd. ordinary shares are 15s.

† Highland Transport Co. Ltd. shares are 17s. The L.M.S.R. holds 17,500 ordinary shares

‡ Profits distributed as dividends in 1943

Locomotive Axleboxes

(Continued from page 438)

practice. Two railways use the former in their latest designs, one the latter, and the remaining company uses neither, nor indeed any type of feed external to the axlebox itself. All railways still have large numbers of engines with trimming feeds.

Regarding oil grooves, the straight groove on the vertical centre line was the most usual on the earlier engines; it is correctly placed in a zone of least pressure in the case of inside-cylinder engines working heavily, but is incorrectly placed for coasting conditions. The arrangement of two grooves at 40 deg. to the vertical centre line, or, alternatively, the oval groove in the crown appear to be the best compromise from the point of view of ensuring that the oil reaches the journal under every possible condition. The oval groove, however, is not amenable to shrouding with brass and some wiping over of the white metal into the groove is sometimes experienced. All these arrangements break up the smooth continuous surface of the bearing, and it was to avoid this that the centre-line type of oil feed was introduced. This has been very successful and is standard on all modern boxes which are moderately loaded. It has not been successful, however, on bearings with excessive loadings in the region of the horizontal centre line.

The wear of boxes, resulting in rough riding, plays a large part in determining the mileage at which the engine has to be taken out of traffic for classified repair, and so is a major factor in availability.

The G.W.R. has dispensed with upper feed entirely on its modern engines and relies solely on underkeep and pad for coupled axlebox lubrication; the pad in this case is of felt. That railway, however, has a preponderance of outside-cylinder engines with generous sized bearings.

The average mileage from new or general repair to first service repair on the L.M.S.R. was 64,000 for all engines in 1939, and up to 75 per cent. of engines come in at this repair primarily for box condition. There is thus some distance still to go before box performance can be made to coincide with mileage between boiler changes, which in the same year was 114,000.

The actual flat wearing surfaces of the box which work against the steel wheel boss and horn block surfaces can be either white metal or bronze. White metal of suitable composition correctly applied gives a performance much beyond that which its soft nature would lead one to expect, and its rapidity and ease in handling on the repair side is pre-eminent. On the other hand, dirt and grit, so often present, readily becomes embedded in its surface, so that it acts almost as a lap in scoring and grinding adjacent steel surfaces.

The bronze plate, studded on to the flat surfaces of the axle boxes, is sometimes proposed as a means of reducing rate of wear. The claim is that while wear of the bronze surface itself may be as great, total wear bronze plus steel may be less. This contention has to rest "not proven" so far as L.M.S.R. experience is concerned, and although these bronze liners have been tried extensively, they have so far shown no clear advantage over white metal. They have, however, a tendency to work loose on the studs which hold them. Recently 35 new engines have been fitted with the bronze liner transferred to the steel horn block, where arrangements can be made for it to be bolted on, thus providing a more substantial fastening than does the former method of studding to the box face. On

the box itself renewable steel wearing strips are welded on to the steel carcase.

It is probable that more efficient dust shielding would assist in reducing wear. On most of the older classes, and especially where axle collars remain, no dust shields are fitted on the L.M.S.R. The most difficult point to shield is the wheel boss side, and here no effective and practical solution has yet been found.

The only available alternative to the plain bearing is the roller bearing, which locomotive engineers are viewing with considerable interest, having regard to its increasing use in the U.S.A. in all types of axlebox, both carrying, coupled, and tender. There is little first-hand information applicable to British practice.

On the L.M.S.R. the turbine-driven locomotive No. 6202 is fitted throughout with Timken roller bearings, and in addition there are three six-wheel tenders so equipped. The roller bearings, which have been inspected from time to time, have continued in excellent condition and without appreciable wear. On the tenders the usual amount of wear between axlebox and horn guides has been taken up by re-metalling the detachable brass liner.

On the coupled boxes the Timken patented trunnion horn guide, of special alloy steel mounted on circular trunnions solid with the boxes has been fitted to allow for relative vertical displacements of the box on the two sides of the engine. The trunnion guides work against phosphor bronze liners bolted and studded to the horn guides. No appreciable wear has taken place on the trunnion guides, and the bronze liners required renewing only after 158,502 miles.

The interesting feature here is not only the trouble-free behaviour of the actual roller bearings, which was expected, but the improved performance of the flat surfaces. Much of this is due to the even torque of the turbine as against the fluctuating loading of a reciprocating engine but some also appears due to the nature, design and lubrication of the surfaces in contact with the horn blocks, and there appears to be a lesson here which could equally be applied to plain bearing axleboxes.

Finally, mention must be made of the very low oil consumption with roller bearings, about 3 oz. per 5,000 miles for each coupled box.

Questions in Parliament

Stoppage of Work on L.P.T.B. Vehicles

Major A. M. Lyons (East Leicester—C.) on April 21 asked the Parliamentary Secretary to the Ministry of War Transport whether, in view of the stoppage of work on London passenger vehicles, he could state what arrangements were being made for the transport of essential workers over the weekend, and what statement could be made on the position.

Mr. P. J. Noel-Baker (Parliamentary Secretary, Ministry of War Transport): As Major Lyons has no doubt already heard, His Majesty's Government has made military personnel and vehicles available to assist the London Passenger Transport Board in maintaining its essential services.

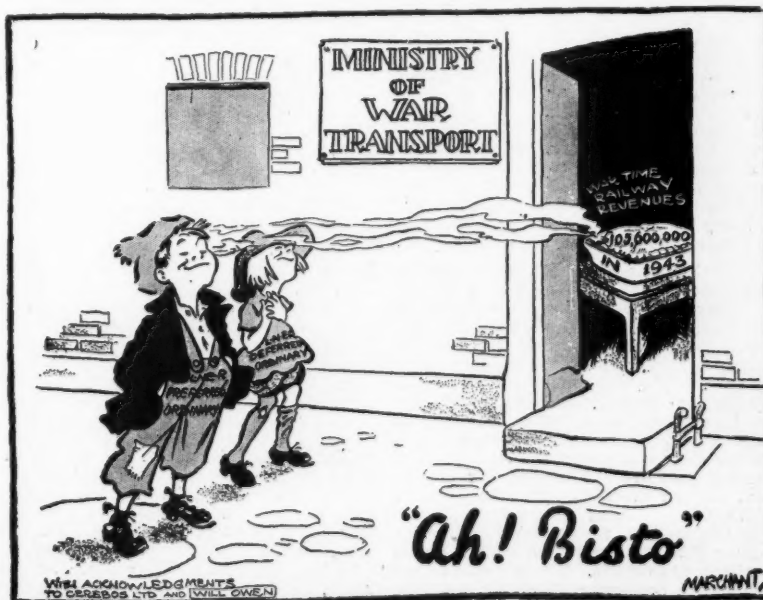
Major Lyons: Are arrangements made

for an increase of the personnel to meet any further stoppage that may occur during the weekend; and, further, to what extent, notwithstanding this utilisation of military personnel, is there dislocation of the general passenger services?

Mr. Noel-Baker: The dislocation has been extraordinarily small. I am hoping that the men will go back but, we shall make arrangements to meet the situation.

Mr. W. Thorne (Plaistow—Lab.): The Parliamentary Secretary knows that one of the causes of the strike was the alteration of the schedules, which the men said prevented them having more rest. Was there any negotiation before the schedules were put into operation?

Mr. Noel-Baker: Certainly there were negotiations. The union dealt with all that and is very anxious for the men to go back.



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Notes and News

Millford Docks Company.—The dividend for the year 1943 is 2 per cent., less tax, the same as for 1940, 1941, and 1942.

Port of London Charges.—The Minister of War Transport on April 7 made the Port of London (Increase of Charges) Order, 1944.

Assistant Accountants Required.—The Nigerian Railway requires the services of certain Assistant Accountants. Details are given in our Official Notices on page 455.

Canals (Agreement) Powers Order.—The Minister of War Transport on April 4 made the Canals (Agreement) Powers Order, 1944 (S.R. & O. 1944 No. 407) in virtue of his powers under Regulation 69 of the Defence (General) Regulations, 1939. (See page 430)

Birmingham Railway Carriage & Wagon Co. Ltd.—Preliminary statement shows that the profit for the year to December 31, 1943, after providing for taxation, was £78,894 (£74,754), and £99,694 was brought in. A sum of £40,000 (£60,000) is allocated to contingencies reserve and the ordinary dividend for the year is 7½ per cent., the same as for the four previous years, leaving £93,244 to be carried forward.

New Eire Transport Company.—The undertakings of the Great Southern Railways Company, and of the Dublin United Transport Co. Ltd. are to be transferred to, and vested in the new statutory company on July 1. That date, as both the date of incorporation of the new company, and also of the transfer, is named in the new Eire Transport Bill, the text of which was issued in Dublin on April 20. Stocks of the new company will be substituted for stocks in the existing companies, which are to be dissolved. Further reference to this is made in an editorial note, page 429. The title of the new company is given in Erse as Coras Iompair Eireann (the Transport Company of Ireland).

San Paulo-Parana Railway.—As recorded in our March 24 issue, shareholders of Parana Plantations Limited on February 25 last approved proposals for the sale to the Federal Government of the company's Brazilian assets, which include practically the whole issued share capital of the Companhia Ferroviaria São Paulo-Parana. By a recently-issued Presidential Decree, the lines of the latter company have been incorporated into the system of the Federal Government-owned Parana-Santa Catharina Railway. In addition to that mentioned above, recent references in our columns to the San Paulo-Parana Railway include an editorial article in our January 21 issue and news paragraphs in our issues of February 4 and February 25.

Birmingham & Midland Motor Omnibus Co. Ltd.—The report of this company, which is jointly controlled by the L.M.S. and G.W. Railway Companies and by the British Electric Traction Co. Ltd., shows that in 1943 net traffic and other receipts amounted to £1,617,794 (£1,694,736) and interest and dividends received to £66,541 (£24,289). Net profit after providing for administration expenses, vehicle duty and petrol taxes, employees' benefit, £947,076 (£1,026,986) for income tax, and for other charges, was £334,347 (£275,605). After deducting £70,000 (£50,000) placed to general reserve and adding £133,708 brought in, there is a sum available of £398,055. The dividend on the cumulative preference shares for the year, subject to deduction of tax, takes £8,000, the dividend of 10 per cent. on the ordinary

shares for the year, subject to deduction of tax, requires £144,000, and the bonus of 5 per cent. on the ordinary shares, subject to deduction of tax, takes £72,000, carrying forward £174,055. Dividends and bonus are the same as for 1942.

Midland Railway Co. of Western Australia Limited.—The directors recommend a dividend of 4 per cent. on the unified ordinary stock in respect of the year to June 30, 1943, less income tax at 10s. in the £. The sum of £2,373 will be placed to reversionary certificates redemption account.

Costa Rica Washaway.—In December last, torrential rains caused landslides in Costa Rica, and washed away a large iron bridge on the Northern Railway (3 ft. 6 in. gauge) between Port Limon and San Jose, thus placing the main line out of commission for two weeks. As the Northern Railway is the only means of transport between the east coast and the interior, there was a scarcity of essential commodities throughout the Republic, causing prices to rise. The railways of Costa Rica were briefly described (with map) in our issue of May 14, 1943 (page 484).

Hull Corporation as L.N.E.R. Stockholder.—The Hull Corporation has by 35 votes to 31 rejected the recommendation of its Finance Committee that the Corporation should become a subscribing member of the L.N.E.R. Stockholders' Association in support of the efforts of the association to obtain a revision of the terms of the Railway Control Agreement. The Corporation holds £100,000 of L.N.E.R. 4 per cent. second preference stock, which was allotted to it on grouping to represent its holding in the former Hull & Barnsley Railway Company.

Joint Municipal Bus Purchase.—The corporations of Manchester, Rochdale, and Oldham have approved the joint purchase of the bus service of Yellowway Motor Services Limited, at a cost of £38,500. Of the total sum, Manchester will pay £13,743, Oldham £16,651, and Rochdale £8,106. These quotas are based on the bus mileage in the respective municipal areas, namely, Manchester, 4 miles 537 yd.; Oldham, 5 miles 380 yd.; and Rochdale, 2 miles 949 yd. The purchase involves taking over the company's buses, which will be allocated to the three corporations on a *pro rata* basis. The transaction is subject to the approval of the Regional Commissioner. The company was incorporated on November 24, 1915, as Holt Brothers (Rochdale) Limited. Its bus services were begun in 1927. The name of the company was changed to Yellowway Motor Services Limited, in April, 1932. The company proposes to retain its excursions and tours motor-coach business.

L.N.E.R. (Scottish Area) Trailer Pump Competition.—The final of the L.N.E.R. (Scottish Area) Trailer Pump Competition was held on the Grange Cricket Club Ground, Comely Bank, Edinburgh, on April 8, when the winners of the preliminary contests from Edinburgh, Glasgow, Aberdeen and Hawick, met to decide who should represent the Scottish Area in the inter-railway competition held at Marylebone on May 6. The winner in the "light" competition was the team from the District Engineer's Workshop, Hawick, whose time was 1 min. 38½ sec. and the runners up St. Margaret's Locomotive Works, Edinburgh (time 1 min. 43½ sec.). In the heavy class, the team from the District Engineer's Workshop, Shettleston, won in 2 min. 27 sec. and the runners up were Leith Central Station in 2 min. 30½ sec. Mr. T. F. Cameron, Acting

Divisional General Manager, Scottish Area, L.N.E.R., presided, and the prizes and certificates were presented by Mrs. T. F. Cameron. The judging was by Mr. W. B. Muir, Fire Force Commander, N.F.S. (South Eastern Area), Edinburgh, and his officers.

L.N.E.R. (N.E. Area) Trailer Pump Competition.—The finals of the North Eastern Area Trailer Pump Competition took place at York on April 15. The winners were Middlesbrough Goods, with a

British and Irish Railway Stocks and Shares

Stocks	Highest 1943	Lowest 1943	Prices	
			April 25, 1944	Rise/ Fall
G.W.R.				
Cons. Ord.	65½	57½	59	— ½
5% Con. Pref.	120½	108	117½	+ 1
5% Red. Pref. (1950) ..	110½	106	107½	— 1
5% Rt. Charge	137½	123½	129½	— 1
5% Cons. Guar.	135½	121½	127½	— 1
4% Deb.	118	107½	114½	+ 1
4½% Deb.	119	109½	114½	— 1
4½% Deb.	124½	116	120½	— 1
5% Deb.	138	127	131½	— 1
2½% Deb.	77	72½	74½	— 1
L.M.S.R.				
Ord.	34½	28	30	— ½
4% Pref. (1923)	66½	58	59½	— 1
4% Pref.	80½	73	77	— 1
5% Red. Pref. (1955) ..	105½	102	104½	— 1
4% Guar.	107	93½	101½	— 1
4% Deb.	109½	103½	105½	— 1
5% Red. Deb. (1952) ..	111½	108	109½	— 1
L.N.E.R.				
5% Pref. Ord.	12½	71	9	— 1
Def. Ord.	51	38	41	— 1
4% First Pref.	66½	57½	59½	— 1
4% Second Pref.	36½	30½	32½	— 1
5% Red. Pref. (1955) ..	99½	93	100½	— 1
4% First Guar.	102½	94	98	— 1
4% Second Guar.	93½	85½	89½	— 1
3% Deb.	86½	78½	83	+ ½
4% Deb.	109½	101½	104½	— 1
5% Red. Deb. (1947) ..	106½	102	103	— 1
4½% Sinking Fund Red. Deb.	108	103½	104½	— 1
SOUTHERN				
Pref. Ord.	80	72½	77	— 1
Def. Ord.	26½	20½	24½	— 1
5% Pref.	119½	106½	116	+ 1
5% Red. Pref. (1964) ..	114	108½	113½	— 1
5% Guar. Pref.	136	122	127½	— 1
5% Red. Guar. Pref. (1957)	117	109½	113½	— 1
4% Deb.	117½	106	111½	+ 1
5% Deb.	137	126	130½	— 1
4% Red. Deb. (1962- 67)	112	106½	110½	— 1
4% Red. Deb. (1970- 80)	112	107	110½	— 1
FORTH BRIDGE				
4% Deb.	109	104½	105	— 1
4% Guar.	105	102½	103½	— 1
L.P.T.B.				
4½% "A"	125½	114	121½	— 1
5% "A"	133½	123	130½	— 1
3% Guar. (1967-72) ..	100½	97	99	— 1
5% "B"	124	114	119½	— 1
"C"	72	53	71	— 1
MERSEY				
Ord.	34½	27	33½	— 1
3% Perp. Pref.	68	59½	69	— 1
4% Perp. Deb.	104	102½	103	— 1
3% Perp. Deb.	83	78½	79	— 1
IRELAND BELFAST & C.D.				
Ord.	9	6	6½	— ½
G. NORTHERN				
Ord.	24½	16	20½	— 1
Pref.	—	—	39½	— 1
Guar.	—	—	61½	— 1
Deb.	—	—	85½	— 1
G. SOUTHERN				
Ord.	30	9½	43½	— 3½
Pref.	30	11	44½	— 1
Guar.	64	26½	63½	+ 1
Deb.	88½	51½	91	— 1

§ ex-dividend

OFFICIAL NOTICES

Overseas Employment

ASSISTANT ACCOUNTANTS required by the Nigerian Government Railway for one tour of 12 to 24 months with possibility of permanency. Commencing salary in the scale £400-£25-£600-£30-£720 a year according to qualifications and experience. Separation allowance for married men is £160 on £400. Free passages and quarters. Candidates should have

had suitable accounting experience or alternatively be Members of one of the appropriate professional bodies. Applications in writing (no interviews), stating date of birth, full details of qualifications and experience, including present employment; also Identity and National Service or other registration particulars, and quoting Order No. O.51775, should be addressed to the Ministry of Labour and National Service, Appointments Department, Sardinia Street, Kingsway, London, W.C.2.

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time of 2 min. 19½ sec. and the runners up Newcastle Forth A, whose time was 2 min. 27½ sec. Mr. C. M. Jenkin Jones, Divisional General Manager (North Eastern Area) L.N.E.R., presided, supported by the chief Area Officers, and the prizes and certificates were presented by Mrs. C. M. Jenkin Jones. The judging was performed by Column Officer J. A. Perkins, and other officers of the Hull N.F.S.

Condensing Locomotives.—At a general meeting of the Institution of Mechanical Engineers to be held at 5.30 p.m. on May 19, a paper on "Condensing Locomotives" will be given by Professor G. V. Lomonosoff, Dr.-Ing., M.I.Mech.E., and Captain G. Lomonosoff, R.E.M.E.

Formation and Drainage of Permanent Way.—At a meeting of the Manchester & Liverpool Section of the Permanent Way Institution, to be held in the Temperance Institute, Southport, at 3 p.m. on May 6, a paper on "Formation and Drainage" will be given by Mr. W. H. Best, B.Sc., A.M.Inst.C.E., of Liverpool.

Two Paris Stations Closed.—On April 19 the Paris radio announced: "Because of extensive repairs, the Gare de l'Est is temporarily closed and all express and passenger trains are being diverted to other termini." Later the same evening it was added: "As a result of considerable alterations, fast and express passenger trains which up to now have been arriving at and leaving from the Gare de l'Est and Gare d'Austerlitz will, until further notice, arrive and depart from the Gare de Lyon."

Institute of Transport: Surrey Area Discussion Group.—Further fixtures have now been made by the Surrey Area Discussion Group, the formation of which was recorded in our issue of April 14 (page 402). The forthcoming programme is as follows:—

Date	Subject	Discussion leader
May 4	"Problems of transport operations"	Mr. G. J. Dickens (L.P.T.B.)
" 25	"Education and training for transport"	Mr. C. Rayner (L.P.T.B.)
June 15	"Transport in relation to State"	Mr. W. H. Stevens (Southern Rly.)
July 6	"Transport Co-ordination"	Mr. R. S. Turnbull (L.P.T.B.)

All meetings are being held at the Lesbourne Road, Reigate, offices of the London Passenger Transport Board.

Institution of Locomotive Engineers.

—The thirty-third annual general meeting of the Institution of Locomotive Engineers was held on April 20, when the annual report of the Council was presented. The balance sheet shows that investments at cost at December 31, 1943, amounted to £5,359, the same as at the end of the previous year. A new item appears in the balance sheet under the title of "Charles S. Lake Memorial Fund." This fund is the sum of £250, presented to the Institution by the proprietors of *The Railway Gazette* in memory of the late Mr. Charles S. Lake, for the establishment of a library wing to be available to all members. The report states that details of the scheme will be published in due course in the *Journal* of the Institution. The income and expenditure account for 1943 shows an excess of income over expenditure of £445, against £796 for

the preceding year. The total membership at December 31 last was 1,693, compared with 1,678 at the end of 1942. During the year 1943 two members received the honour of knighthood, and other members were appointed as follows:—C.I.E., three; C.B.E., three; O.B.E., three; and M.B.E. five.

"Travel on Wool."—At the show-rooms of the International Wool Secretariat, 22, Bruton Street, London, W.1, an exhibition of British cloths suitable for upholstery in all forms of civilian transport was opened on April 20 by Sir Charles McCann, Agent-General & Trade Commissioner for South Australia, Chairman of the Secretariat. In his opening address he stated that most of the cloths exhibited were 100 per cent. wool, and that the International Wool Secretariat represented the wool-producing interests of the Dominions—Australia, South Africa and New Zealand, which had an aggregate of 190 million sheep. The exhibition, which is open until May 25, is divided into four main groups—rail, air, sea and road. In the train-upholstery section a seat from a L.N.E.R. standard first class coach, and first and third class Pullman bucket-chairs from the L.M.S.R. Coronation Scot train, are on view. Scientific research has resulted in the production of some remark-

able woollen cloths, among which are the moth-proof, water-proof, non-inflammable and "stainless" types.

Forthcoming Meetings

April 28 (Fri.).—Institution of Mechanical Engineers, Storey's Gate, London, S.W.1, 5.30 p.m. "The application of fabricated construction to machine design," by F. Koenigsberger. General meeting.

May 2 (Tues.).—Institution of Civil Engineers, Great George Street, Westminster, London, S.W.1, 5.30 p.m. "The strength of cast-iron girder bridges," by C. S. Chettoe, and Norman Davey. Ordinary Meeting.

May 6 (Sat.).—Permanent Way Institution (Manchester & Liverpool Section), at the Temperance Institute, Southport, 3 p.m. "Formation and Drainage," by W. H. Best.

May 16 (Tues.).—Institution of Civil Engineers, Great George Street, Westminster, London, S.W.1, 5.30 p.m. "Stresses in concrete sleeper track," by F. Johansen, and "Experiments on concrete sleepers," by F. G. Thomas. Railway Engineering Division meeting.



A part of the interior of the recently opened L.M.S.R. Northern Counties Committee city offices in Belfast. The design and accommodation of the passenger booking and enquiry offices are probably the finest of their kind in the British Isles. Included in the accommodation for the public, is comfortable seating for air-service passengers waiting to join the bus to the Harbour Airport; four pictures of Irish scenery, after paintings by Mr. Humbert Craig, R.H.A., are exhibited on the walls

Railway Stock Market

Stock markets have remained in the subdued mood prevailing in recent weeks, although confidence was indicated by absence of selling. The moderate amount of business was again attributed to the general tendency to await war developments. British Funds continued firm, and among home rails there was again investment buying of prior charges and senior preference stocks, which continue to give attractive yields in relation to their investment merits. They seem likely to remain in better demand, bearing in mind the weight of money awaiting investment, and the fact that, unlike many industrial and other prior charge stocks, those of main-line railways do not have a restricted market.

Home railway junior stocks tended to be adversely influenced by the wages increase, although it is generally realised that they will not affect the wartime income of the railways under the fixed-rental agreement. Increased wages and other costs may have an important bearing on the post-war position, when, however, the whole transport system of the country will come up for revision. Then the railways will be expected to be allowed to function on a more equitable basis than was the case before the war, when, it will be recalled the "square deal" proposals were on the point of coming into force. They would, of course, have improved the dividend outlook for the

junior stocks. The latter still seem unable to move higher, despite yields ranging up to over 8 per cent., although there is little doubt that when markets show sustained improvement, yields considerations will attract more attention to railway stocks. It may be noted that, despite the inactivity of markets in recent weeks, numerous leading industrial shares have continued to move higher in price, and in many cases yields on the basis of current dividends are now between 3½ per cent. and 4 per cent. or even lower. This small-yield basis reflects the assumption that higher dividends may rule after the war. Meanwhile, there is little doubt that home railway junior stocks are considerably undervalued in comparison. Moreover, it seems anomalous that stocks such as Southern and Great Western 5 per cent. preferences offer yields of fully 4½ per cent. or considerably more than the return shown on a wide range of equity or ordinary shares of industrial companies.

Compared with a week ago, Great Western ordinary eased from 60 to 59. On the other hand, the 4 per cent. debentures further improved from 113½ to 114, and the 5 per cent. preference at 117½ was also fractionally better and the guaranteed stock held its recent improvement to 127. L.M.S.R. ordinary reacted further from 30½ to 30½, and now yields over 8½ per cent.; the senior preference was 77, compared with 77½ a week ago, and the 1923

preference 59½ compared with 59½. L.M.S.R. guaranteed remained at 101, and the 4 per cent. debentures at 106. Among L.N.E.R. stocks, there was a little speculative activity in the preferred ordinary at the slightly better level of 9, but compared with a week ago, the second preference eased from 32½ to 32½, and now yields over 8½ per cent. L.N.E.R. first preference was 59½, as compared with 60 a week ago. Southern deferred was half-a-point down at 24½, with the preferred 76½, compared with 77. On the other hand, Southern 5 per cent. preference improved further from 115½ to 116, and the guaranteed stock moved better at 127½; the 4 per cent. debentures were 111½. London Transport "C" held its recent rise to 72.

Sentiment as to Argentine securities generally was affected by the expropriation terms announced in respect of the Primitiva Gas Company, and on balance Argentine railway stocks have shown further small declines. There was, however, very little selling. B.A. Gt. Southern ordinary was 12½, the 6 per cent. preference 19½, and the 4 per cent. debentures 58½.

In other directions, Leopoldina Railway debentures eased to 55, and United of Havana 1906 debentures from 29½ to 28½. Antofagasta preference lost a point at 36½. Canadian Pacifics were 15 and the 4 per cent. preference stock 72½.

Traffic Table and Stock Prices of Overseas and Foreign Railways

	Railways	Miles open	Week ending	Traffic for week		No. of Weeks	Aggregate traffic to date			Shares or stock	Prices							
				Total this year	Inc. or dec. compared with 1942/3		Totals		Increase or decrease		Highest 1943	Lowest 1943	April 25, 1944	Yield % (Note)				
							1943/4	1942/3										
South & Central America	Antofagasta (Chile) & Bolivia	834	16.4.44	30,400	+	£ 6,640	16	448,220	424,990	+	23,230	Ord. Stk.	15½	10	11	NH		
	Argentine North Eastern	753	15.4.44	15,600	+	2,268	42	600,228	513,066	+	87,162	Ord. Stk.	7½	5	5	NH		
	Bolivar	174	Mar., 1944	6,006	—	514	13	15,953	16,331	—	3.8	6 p.c. Deb. Bonds	22½	18	17	NH		
	Brazil	—	—	—	—	—	—	—	—	—	—	—	—	—	—	NH		
	Buenos Ayres & Pacific	2,807	15.4.44	129,840	+	14,940	42	4,418,760	4,178,640	+	240,120	Ord. Stk.	8½	5½	6½	NH		
	Buenos Ayres Great Southern	5,080	15.4.44	158,640	+	9,180	42	7,503,000	6,802,560	+	700,440	Ord. Stk.	17½	9½	12½	NH		
	Buenos Ayres Western	1,930	15.4.44	69,360	+	13,980	42	2,342,040	2,260,440	+	81,600	Ord. Stk.	16	9½	11	NH		
	Central Argentine	3,700	15.4.44	168,315	+	35,037	42	6,266,737	5,572,257	+	714,480	Ord. Stk.	10½	6½	8½	NH		
	Do.	—	—	—	—	—	—	—	—	—	—	Dfd.	4½	3	4	NH		
	Cent. Uruguay of M. Video	972	15.4.44	28,252	—	12,770	42	1,404,509	1,192,601	+	211,908	Ord. Stk.	7½	4½	4½	NH		
	Costa Rica	262	Feb., 1944	22,805	+	4,909	33	175,664	114,452	+	61,212	Ord. Stk.	16	12½	15	NH		
	Dorada	70	Mar., 1944	25,589	+	6,059	13	73,281	59,520	+	13,761	1 Mt. Db.	96	92	93½	NH		
	Entre Rios	808	15.4.44	20,892	—	4,191	42	820,974	742,326	+	78,648	Ord. Stk.	9	5½	6	NH		
	Great Western of Brazil	1,030	15.4.44	20,000	+	6,100	16	354,000	255,800	+	98,200	Ord. Sh.	59/9	24½	28/9	NH		
	International of Cl. Amer.	794	Feb., 1944	\$819,809	+	\$163,288	8	\$1,534,088	\$1,312,320	+	221,768	—	—	—	—	NH		
	Interoceanic of Mexico	—	—	—	—	—	—	—	—	—	—	1st Pref.	2½	1½	—	NH		
	La Guaira & Caracas	22½	Mar., 1944	7,704	—	1,656	13	21,956	27,435	—	5,479	5 p.c. Deb.	90	80	83½	NH		
	Leopoldina	1,918	8.4.44	50,421	+	16,507	15	629,027	462,597	+	166,430	Ord. Stk.	7½	4	5	NH		
	Mexican	483	14.4.44	ps. 567,500	+	ps. 216,600	16	ps. 6,129,630	ps. 5,144,800	+	ps. 984,800	Ord. Stk.	1½	½	½	NH		
	Midland Uruguay	319	Feb., 1944	16,340	+	1,701	34	1,6487	116,70	+	19,787	—	—	—	—	NH		
	Nitrate	382	15.4.44	8,072	+	1,392	14	61,552	42,058	+	19,494	Ord. Sh.	83/9	71/3	68/9	NH		
Paraguay Central	274	14.4.44	\$54,110	+	\$8,710	16	\$2,114,219	\$1,653,520	+	\$460,699	Pr. Li. Stk.	75	51½	70	8	NH		
Peruvian Corporation	1,059	Mar., 1944	117,202	+	26,463	39	96,656	75,581	+	207,105	Pref.	17½	10½	10	—	NH		
Salvador	100	Feb., 1944	€188,000	+	€ 25,000	34	€ 984,000	€ 772,000	+	€ 212,000	—	—	—	—	—	NH		
San Paulo	153½	—	—	—	—	—	—	—	—	—	Ord. Stk.	71	57	49	4½	NH		
Tafel	160	Mar., 1944	4,745	+	310	39	50,015	41,346	+	8,669	Ord. Sh.	37/6	20½	17/6	—	NH		
United of Havana	1,301	15.4.44	82,499	+	16,451	42	2,376,183	2,112,959	+	213,224	Ord. Stk.	8½	3½	3½	—	NH		
Uruguay Northern	73	Feb., 1944	1,425	—	31	31	11,503	11,064	+	439	—	—	—	—	—	NH		
Canada	Canadian Pacific	17,034	14.4.44	1,237,000	+	173,000	16	17,366,200	14,772,600	+	2,589,400	Ord. Stk.	18	13½	15	—	NH	
	India	Barsi Light	202	Feb., 1944	25,575	+	3,285	47	237,600	197,852	+	39,998	—	—	—	—	—	NH
		Bengal-Nagpur	3,267	Feb., 1944	974,475	+	23,250	7	11,369,400	10,049,850	+	1,319,550	Ord. Stk.	104½	101½	107½	—	NH
		Madras & Southern Mahratta	2,939	Mar., 1944	320,475	+	25,632	48	10,089,741	8,547,891	+	1,541,850	—	—	—	—	—	NH
South Indian	2,349	20.12.43	19,410	+	24,449	37	5,321,558	4,562,415	+	750,113	—	—	—	—	—	NH		
Various	Egyptian Delt.	—	20.2.44	19,780	+	5,522	8	543,990	418,153	+	125,837	Pr. Sh.	6½	2½	5	—	NH	
	Manila	—	—	—	—	—	—	—	—	—	B. Deb.	45	32	40	—	NH		
	Midland of W. Australia	277	Feb., 1944	21,583	—	6,758	33	245,504	252,708	—	7,204	Inc. Deb.	101	93	100½	—	NH	
	Nigerian	1,900	29.1.44	99,395	—	18,357	30	3,418,855	2,944,340	+	474,515	—	—	—	—	—	NH	
	South Africa	13,291	5.2.44	906,790	+	63,914	40	37,522,295	34,935,498	+	2,586,797	—	—	—	—	—	NH	
	Victoria	4,774	Nov, 1943	1,335,935	—	64,116	—	—	—	—	—	—	—	—	—	—	NH	

Note. Yields are based on the approximate current price and are within a fraction of ½. Argentine traffic is given in sterling calculated @ 16½ pesos to the £. Receipts are calculated @ 1s. 6d. to the rupee. \$ ex dividend